

TOLL ROADS

and

The Problem of Highway Modernization

By

WILFRED OWEN

and

CHARLES L. DEARING

Published by

THE BROOKINGS INSTITUTION

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Toll roads, which disappeared some decades ago with the horse and wagon, have suddenly revived in the automotive setting of the 20th century. More than half the states have recently considered collecting tolls as a means of financing the extraordinary cost of main road modernization. Several states now have major toll highways in operation or under construction, and present plans may mean 2,000 miles of toll routes for the United States in the not distant future.

The toll road movement has focused attention on the inability of current methods of highway administration and finance to cope with the increasing demands of motor vehicle traffic. The purpose of this book is to analyze the advantages and disadvantages of the toll road, to indicate the basic defects in state and federal policy which have led to its revival, and to suggest changes in public policy necessary to restore the effectiveness of highway management.

Since the obstacles to policy reform are formidable, some states have found that the toll solution offers the only possibility of realizing promptly the benefits of modern highway transportation. Consequently, this study indicates the ways in which toll finance may be integrated most effectively with conventional financial and administrative measures.

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TOLL ROADS

And the Problem of Highway Modernization

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FOREWORD

Progress in automotive transportation depends on continuing technological development in the automobile and allied industries, and on the provision of adequate highways to permit the benefits of scientific advance in the vehicle and its operation. In the past we have directed the major part of our efforts in this field to the vehicle itself, yet the cost and quality of the final service depend on a balanced development of both vehicle and highway. Failure to give proper weight to the importance of the highway system has resulted in excessive transportation costs and inferior service.

There is growing recognition today that substantial modernization of our highway system must be undertaken to achieve the economy and quality of service which the vehicle is capable of providing. A significant current approach to this goal is the development of toll highways. Many states are authorizing, constructing, and operating toll roads as a means of overcoming as quickly as possible their most critical highway deficiencies. Re-emergence of the toll road raises the question whether this method of financing and pricing highway services offers a desirable solution to the problem of reconstructing our principal highways, and whether traditional methods of highway finance are able to meet present-day requirements.

This study analyzes current toll-road operations and the financial, administrative, and legal problems which have led to this development; and it suggests the revisions in federal and state policy which would be required to provide an alternative solution. The authors analyze

and evaluate the issues raised by the current toll-road movement by reference to a somewhat broader perspective afforded by their previous studies in the transportation field, including *American Highway Policy*, *Automotive Transportation*, and *National Transportation Policy*.

The authors wish to express their appreciation to the organizations which provided data for the study, including the Bureau of Public Roads, the National Highway Users Conference, the Automotive Safety Foundation, the highway departments and legislative reference services of the several states, and the turnpike authorities in Maine, New Jersey, and Pennsylvania. Dorothy Sonnenberg participated in the project as research associate.

The Co-operating Committee of the Institution consisted of Cleona Lewis and myself.

HAROLD G. MOULTON
President

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PART I

BACKGROUND OF THE PROBLEM

In order to establish a basis for evaluating the toll method of providing highways, the chapters of Part I describe the extent of the toll-road movement, the underlying highway problem which it attempts to meet, factors which have promoted the adoption of toll roads, the advantages and disadvantages of toll roads as a solution to the highway problem, and the financial prospects of toll roads as self-liquidating projects.

CHAPTER I

THE TOLL-ROAD MOVEMENT

Until the opening of the Pennsylvania Turnpike in 1940, the growth of the automotive era had been accompanied by widespread and successful efforts to free the last remaining turnpikes on which tolls were still being collected. Reinstatement of the toll method in Pennsylvania, however, has been followed by similar projects in a number of states, and the environment of the twentieth century now appears to hold more promise for the turnpike than the nineteenth century which rejected it.

Altogether, 28 states have given consideration to the construction of toll facilities as a solution to their highway problems, and 18 have some type of toll-road legislation in effect.¹ There are now 424 miles of main routes in the United States on which tolls are collected, an additional 350 miles are under construction, and nearly 1,200 miles specifically authorized or in the planning stage. There is the possibility, therefore, that some 2,000 miles of toll highways may be operating in the United States on principal intercity routes within the next few years. (See table page 5.) Additional toll-road construction might be undertaken in states which have general authorization to provide toll roads but have taken no steps to plan or designate specific routes.

The toll method of finance has assumed a variety of forms. In a limited number of cases the toll has been imposed to pay for a specific revenue bond issue without

¹ For details of toll-road legislation by states, see App. pp. 190-92.

recourse to the general credit of the state. In other cases tolls have been imposed where general credit bonds

TOLL-ROAD MILEAGE IN THE U. S. 1950^a

State	Miles		
	In Operation ^b	Under construction	Specifically Authorized
Colorado.....		34	
Connecticut.....	66		
Maine.....	44		o
New Hampshire.....	14		
New Jersey.....		130	
New York.....	40		486 ^d
Ohio.....			239
Oklahoma.....		119	
Pennsylvania.....	260	67	234
Virginia-North Carolina.....			54
West Virginia.....	—	—	185
Total	424	350	1,198 ^e

^a Data compiled from legislative documents.

^b There are also some 20 scenic toll roads aggregating about 100 miles, which are for the most part privately owned and of no significance from the standpoint of state or national highway policy. Another toll facility in a special category is the Florida Overseas Highway extending 122 miles from the Florida mainland to Key West.

^c Total of 400 miles authorized by 1941 legislation. Preliminary study has been made of 130-mile extension to Bangor.

^d The New York Thruway is under construction as a free road pending final financial arrangements.

^e Preliminary plans also include possible extension of the Pennsylvania Turnpike to connect with the New Jersey Turnpike. The New Jersey Turnpike Authority is studying a 118-mile toll route from Camden to Atlantic City as well as two additions to the cross-state turnpike now under construction.

rather than revenue bonds have been used, and where the facility has been additionally financed either through

federal grants or allocations of state funds. Still another use of the toll device has been merely as an additional source of revenue on roads which were built as free roads, to provide funds for extending the facilities.

THE PENNSYLVANIA TURNPIKE

The Pennsylvania Turnpike, running east and west across the Commonwealth, was opened to traffic in 1940. The original section runs from a point 16 miles west of Harrisburg to within 20 miles of Pittsburgh, a distance of 160 miles, and this has since been extended eastward 100 miles to Philadelphia. Another extension 67 miles westward to the Ohio border is under construction. The Turnpike Commission was also authorized in 1949 to build two additional toll roads to connect the Turnpike with Scranton and Erie.

The Pennsylvania Turnpike was generally thought to be a unique undertaking rather than the forerunner of a general movement in the field of highway transportation. Unlike later toll projects its construction was made possible through the financial assistance of the federal government. The highway is also somewhat unusual because of the savings realized by using a partially developed right of way originally surveyed over a century ago for the construction of a railroad. Before abandonment of the project in 1885, the promoters of the South Penn Railroad had completed 50 per cent of the tunnel boring and 5 per cent of the open-cut excavation at a cost of approximately 10 million dollars.² This

² In 1883 the Pennsylvania Railroad threatened to build a line parallel to the New York Central along the Hudson River. In retaliation Vanderbilt of the New York Central organized a company to construct the South Penn Railroad paralleling the Pennsylvania line.

abandoned property was eventually purchased by the Pennsylvania Turnpike Authority at a price of 2 million dollars.

The idea of building a toll road on the abandoned South Penn right of way was stimulated by the employment problem confronting Pennsylvania in the mid-thirties. A resolution requesting investigation of the feasibility of such a project was introduced in the Pennsylvania Assembly in 1935, and a commission comprising members of the House and Senate was created for this purpose. Through the efforts of the Highway Department a grant was obtained from the Works Progress Administration to make a preliminary survey of the route, and on the basis of this survey the Commission reported favorably on the toll-road project. Legislation was passed in 1937 establishing the Pennsylvania Turnpike Commission.³

The Turnpike Commission first arranged with the Pennsylvania Department of Highways for an advance of funds to finance surveys and engineering. After unsuccessful attempts to market turnpike revenue bonds, efforts were made to sell the bonds to the Reconstruction Finance Corporation. Finally, the federal government through the Public Works Administration, provided a grant equal to 45 per cent of the cost of the

The project was backed by Andrew Carnegie who hoped to obtain lower rates on steel as a result of increased railroad competition. But in 1885, when the job was half finished, Morgan interests apparently became alarmed over the prospects of a destructive rate war and induced Vanderbilt to sell out to the Pennsylvania Railroad Company. See "A Public Necessity," release of the Pennsylvania Turnpike Commission, Nov. 12, 1948.

³ P.L. 774, 1937.

road, and loaned the other 55 per cent through the RFC.⁴ Private interests later absorbed the issue.⁵

The Pennsylvania Turnpike provides a fast route through the Appalachian Mountains with easy grades and curvature, as an alternate to the hilly and winding course of U. S. Route 30. The Turnpike is a four-lane divided road with control of access and grade separation of all intersecting highways. On the original section there are 11 traffic interchanges, including the terminal points. Seven tunnels aggregating 6.7 miles save about 9,000 feet of vertical climb compared to alternate "free" roads.⁶ The full length fare for passenger cars amounts to \$1.50, or slightly less than one cent a mile.⁷ Truck rates vary from \$1.50 to \$10 one way, depending on vehicle weight. Substantial revenues are also derived from filling station and restaurant leases.

The advantages of using the Pennsylvania Turnpike, compared to the parallel free road, U. S. 30, are similar to those realized on any modern highway compared to an inadequate road. That is, a divided multiple-lane roadway with alignment and grades designed to meet the needs of high-speed high-density traffic generally

⁴ The securities taken by the RFC were 30-year bonds at 3.75 per cent sold at a discount to yield 4 per cent.

⁵ Following the original issue of \$40,800,000 of revenue bonds, a number of additional bond issues and refunding operations have taken place, and the various sections of the Turnpike system have been grouped together for financing purposes. Today a total of 211.5 million dollars of bonds are outstanding, representing the original section and the eastern section, and the western section under construction. For further description of Pennsylvania Turnpike finance, see Chap. 5.

⁶ The term "free road" is used frequently throughout this study. It should not be misinterpreted as implying that roads are provided without cost to the user. The specific meaning of the term relates only to the legal aspects of highway access and use, and will be used here to differentiate between toll roads and non-toll roads.

⁷ Round trip fare is \$2.25, or about 0.7 cents per mile.

means safer, faster, more comfortable transportation, as well as lower vehicle operating costs. In this particular area, however, the toll road enjoys an additional advantage. Although both routes cross mountainous terrain, the Turnpike avoids steep grades and sharp curves by the utilization of the abandoned railroad right of way and tunnels. Substantial savings in time and in cost of gasoline, brake and tire wear, and other items are possible, therefore, on the modern road.

An illustration of the differences in gasoline and time consumed on the two roads in mountainous areas is provided by a recent series of truck operating tests conducted on a 25-mile section of the Turnpike and a similar length of the Lincoln Highway directly opposite the Turnpike test section. One test truck, with gross weight of 50,000 pounds, consumed 50 per cent more fuel on the free road than it did on the toll road: 6.3 gallons of fuel on the Turnpike and 9.8 gallons on Route 30. And more than twice as much time was required to travel the 25-mile section of the Lincoln Highway—1 hour 33 minutes compared to 41 minutes on the Turnpike.⁸

Savings were even more striking with heavier loads. Fuel consumption for a truck with gross weight of 139,000 pounds was more than twice as great on the Lincoln Highway as on the Turnpike: 23.8 gallons compared to 10.6 gallons. Elapsed time for the 25-mile run was 2 hours, 6 minutes on the Lincoln Highway and 44 minutes on the Turnpike. These data indicate why the Turnpike has become a major truck route, with revenue from this source accounting for approximately two thirds of all toll receipts.

⁸ Highway Research Board, *Research Report No. 9A* (1950).

The Turnpike has filled an urgent need for a through traffic facility across the state, and it has established the willingness of motor vehicle operators to pay for a modern highway. In addition, it has demonstrated the importance of considering highway costs as an integral part of total transportation costs, and the fact that motorists are willing to pay more for roads if by so doing they can enjoy better service and at the same time realize savings in vehicle operating costs. In 1950 an average of some 12,000 vehicles used the Turnpike daily, and revenues exceeded 9 million dollars. These figures include 42 operating days on the 100-mile Philadelphia extension. In December 1950 travel was divided equally between the original section of the Turnpike and the eastern extension.

Unique factors leading to construction of the original section of the Pennsylvania Turnpike were the unemployment problem, the financial assistance provided by the federal government, and the availability of a usable right of way, but the conditions underlying the demand for roads of that type were not unique. In every state the continuing expansion of motor vehicle traffic and the limited financial resources available for highways had already provided a need for new financing techniques. Thus, although nationwide interest in the apparent success of toll financing in Pennsylvania was diverted temporarily by World War II, this interest was renewed and magnified in the postwar period. Appearance of 15 million more vehicles on our overburdened roads, combined with the staggering cost of achieving anything substantial in the way of major highway improvement, has provided a natural setting for toll-secured revenue bonds.

THE MAINE AND NEW HAMPSHIRE TURNPIKES

The postwar trend to toll roads began with the opening of the 44-mile Maine Turnpike in late 1947. The State of Maine had planned this undertaking just before the outbreak of war, as part of an authorized 400-mile toll road to extend from southern Maine to the Canadian border. The completed section of the Turnpike has the distinction of being the first modern toll road financed entirely through revenue bonds secured by the prospective earnings of the facility. By providing a controlled-access highway from the New Hampshire border north to Portland, it provides the major step toward alleviating the congested conditions on parallel U. S. Route 1.

Following the passage of legislation in 1941 authorizing the Maine Turnpike, the proposal lay dormant and the possibility or feasibility of constructing a toll road in Maine was generally discounted.⁹ Even granting that traffic in the southeastern section of the state had created a bottleneck which was threatening the important resort industry of the state, the desirability of improving these conditions seemed secondary to the desire of commercial interests and adjacent communities along U. S. Route 1 to maintain the highway *status quo*.

It was not until mid-1945 that the possibility of applying the toll-road legislation was considered. In that year the Turnpike Authority conducted a survey of construction costs and traffic potentials; and although there was apparently no justification for an express highway

⁹ The idea of overcoming the congested conditions on U. S. Route 1 in Maine by resorting to an alternate road financed by tolls was conceived largely by one man, Joseph T. Sayward, a Kennebunk manufacturer. He in turn was influenced by the experience of several trips over the Pennsylvania Turnpike, and his friendship with the Chairman of the Pennsylvania Turnpike Commission.

along the northern sections of the 400-mile route specified by the legislature, there appeared to be justification for proceeding with the southern section from the New Hampshire line to Portland. Bonds were sold, and the 44-mile project was started in the spring of 1946. The 20 million dollar Turnpike was opened to traffic in December 1947.

Unlike most dual express highways, the Maine Turnpike is constructed of asphaltic concrete, a decision based on cost considerations as well as the fact that extensive use of salt for ice control on such a surface would not be injurious. The road was built on a fenced right of way with a 300-foot minimum width, with the further protection of a prohibition against outdoor advertising within 500 feet of the right-of-way line. The road itself consists of two 24-foot pavements separated by an 18-foot raised median strip and two 4-foot shoulders. Outside shoulders 10 feet wide are provided as a refuge for disabled vehicles.¹⁰ Most grades are 3 per cent or less, but 2 are a fraction over 5 per cent; curvature is such that no super-elevations are required. There are 7 interchanges on the Turnpike, including the two terminal points. Gasoline stations and a restaurant are located at the midway point, and are leased to private operators.¹¹ The toll rate is 60 cents for passenger cars traveling the entire route, and up to \$1.50 for trucks.

The Turnpike is maintained and repaired by and under the control of the Authority but "at the discretion of the authority, the services of the state highway com-

¹⁰ W. B. Getchell, Jr., "The Maine Turnpike," address before the Association of Highway Officials of the North Atlantic States, Boston, Mar. 2, 1949.

¹¹ A pedestrian underpass provides access to the restaurant from both sides of the roadway.

mission . . . so far as the same are available or expedient may be utilized for this purpose." The Authority is obliged to pay for these services, however. Legislation in Maine also provides that the Turnpike Authority ". . . may utilize the services of the state police to enforce the rules and regulations of the Authority" and the Authority uses these services without reimbursement to the state. The rules and regulations of the turnpike differ from those obtaining on other highways, however, with respect to speed limits, allowable truck sizes, and penalties for traffic violations.

During 1950, the third full year of operation, 1.9 million vehicles used the Maine Turnpike. Revenues were 54 per cent above 1948, sufficient to cover interest and operating costs, and to enable a small balance to be set aside toward eventual retirement of the debt.¹² Nine out of ten vehicles using the Turnpike were passenger cars. Unlike the Pennsylvania highway, which is supported mainly by trucks, the Maine toll road obtains only about 15 per cent of its revenues from commercial vehicles. Traffic volume in 1950 showed a continuing upward trend over the volumes recorded in the same months of the previous two years.

In 1950 a committee of the Maine Good Roads Association issued a report on the feasibility of extending the Turnpike from Portland to Bangor, a distance of 130 miles. The conclusion of the committee was that extension of the highway 63 miles to Augusta would be economically feasible if the fuel tax generated on the combined sections of the Turnpike were added to the potential toll receipts. To the southward, a 14-mile toll road across New Hampshire, connecting the Maine

¹² Analysis of financial outlook is contained in Chap. 5.

Turnpike with the Massachusetts border, was opened in the summer of 1950.¹³

CONNECTICUT PARKWAYS

The Merritt Parkway, which is one of the early examples of express highway design in the United States, was built as a free road through a county bond issue, some assistance from the State Highway Department, and a federal Public Works Administration grant. In order to extend the facility, however, tolls were charged on the original 37-mile section to aid in financing the Wilbur Cross Parkway, an extension of the first section of the road. This application of the toll charge on facilities which are in reality part of the free road system is also found in New York and is being considered elsewhere as a supplemental source of highway revenue.

The Merritt and Wilbur Cross Parkways together provide a continuous limited access highway from the New York State line to Meriden, a distance of 66 miles. It is expected that the road will ultimately be extended to Hartford. There are now two toll stations, one at Greenwich near the New York State line, the other in Milford, about 35 miles to the east. The road is for passenger cars exclusively, and the toll is 10 cents per vehicle at each of the stations. Since there are 25 traffic interchanges at other points where no tolls are collected, motorists whose trips do not take them through the toll stations pay no toll, and others who pass through only one toll station pay only 10 cents. Those passing through both stations, however, pay 20 cents. Thus far more than 50 million vehicles have paid tolls to use this road,

¹³ The special financing arrangements for the New Hampshire Turnpike are described in Chap. 5.

and total collections at the two stations now exceed one million dollars per year. Additional revenues are obtained from gas station rentals and royalties on gasoline sales.¹⁴

The advantages of a modern limited access highway have been amply demonstrated by studies of traffic moving on the Merritt Parkway compared to the parallel free road, U. S. 1. It has been shown for example, that a trip over the expressway involves two stops compared to an average of thirty-nine stops on U. S. Route 1; the time consumed on the expressway is 67 minutes compared to 109 minutes on the old road; and the fatality rate on U. S. 1 is four and one-half times greater than on the Parkway.¹⁵

NEW YORK PARKWAYS

Beginning in 1939 several attempts were made by Westchester County to impose a 10 cent toll on one of its parkways as a means of financing maintenance of the parkway system and paying debt service on outstanding obligations. State legislation finally permitted such toll collection on the Hutchinson River and Saw Mill River Parkways in April 1945.¹⁶ The bill appropriated 2.5 million dollars to reimburse the federal government for its contribution to the cost of constructing the two parkways, a step which was considered necessary in view of the stipulation in federal legislation against the imposition of tolls on highways financed with the aid of federal funds. Westchester County was authorized to issue bonds to cover repayment of this

¹⁴ Further data contained in Chap. 4.

¹⁵ State Highway Department of Connecticut, *Connecticut's Road Program*, November 1946.

¹⁶ S. 1538, Chap. 594, approved Apr. 5, 1945.

2.5 million dollar advance to the state. Net toll collections were to be used for repayment of these bonds, after which revenues would be applied to servicing county parkway and park bonds.¹⁷

The Westchester County Parkways grossed over 2 million dollars in 1949. Operating costs were \$325,000. After debt service on the loan to repay the state for previous federal assistance, a balance of \$600,000 was realized for county parkway purposes.

TOLL ROADS UNDER CONSTRUCTION, AUTHORIZED, OR UNDER STUDY

More than half the states have been considering toll financing as a way out of their major highway problems. New Jersey is proceeding with a 130-mile toll turnpike to cost some 220 million dollars, extending from the Delaware River north to connect with the Hudson crossings to New York City; in Oklahoma financing arrangements have been completed for a toll road from Tulsa to Oklahoma City; Colorado is proceeding with a route from Denver to Boulder; and the Ohio Turnpike Commission has agreed upon the first route in what may be a state-wide system of toll roads. The first Ohio road will presumably extend from the Pennsylvania border to Indiana, and will connect with the westward extension of the Pennsylvania Turnpike, now being constructed to the Ohio line. When this section is completed the original turnpike will be doubled in length to 327 miles.

A number of additional toll-highway projects of considerable importance are in the advanced planning stage. New York State is constructing a thruway from New York City to Buffalo and thence westward to Erie.

¹⁷ The Automobile Club of New York sought an injunction to prevent the toll charges, but in 1946 the New York Court of Appeals decided in favor of Westchester County.

According to present plans of the New York State Thruway Authority, the nearly 500 miles of highway included in this project will be financed by special license fees instead of tolls. The West Virginia Turnpike Authority is at present proceeding with the task of laying out feasible routes, and authorizations have been granted by the state legislatures of Virginia, North Carolina, and Georgia for toll facilities along the Atlantic coast. General authority to construct toll highways is also contained in the statutes of Kentucky and Maryland.

In five states legislative action or executive orders have initiated study committees to investigate the feasibility of toll projects. (See appendix pp. 190-92.) Studies in California and North Carolina are now under way, and negative findings have been reported in Arkansas, Illinois, and Massachusetts. A joint resolution of the California legislature, passed in 1950, calls upon the Division of Highways to study the feasibility of a toll expressway between San Francisco and Los Angeles. In North Carolina an unsuccessful attempt was made by the legislature in 1949 to create a commission to study the desirability of certain heavy-duty turnpikes, but in 1950 the govenor appointed a committee to study the feasibility of a 100 million dollar bond issue for toll highways. The tentative route for the North Carolina toll highway extends from the South Carolina border northward through Charlotte, Greensboro, Durham, and Chapel Hill to Virginia. The idea has been expressed that such a toll facility might connect with the West Virginia toll system to provide improved transportation facilities from North Carolina to the middle west.¹⁸

In Massachusetts legislation was passed in 1949 creat-

¹⁸ *Bond Buyer*, Mar. 4, 1950, p. 6.

ing the Massachusetts Turnpike Commission to study the feasibility of a toll expressway running diagonally across the state from the New Hampshire line to Connecticut.¹⁹ The Turnpike Commission reported to the legislature in 1950 that sufficient traffic could not be generated on the proposed route in the foreseeable future to make the project self-supporting.

A number of toll-road bills introduced during the past three years failed to pass. They are cited, however, because they provide further indication of dissatisfaction with existing highway financing practice, and because they may be the forerunners of ultimately successful legislation. (See appendix, pp. 190-92.) It has frequently been the case that toll-road legislation has been preceded by one or more unsuccessful legislative attempts. Alabama has considered the possibility of a toll road from the Tennessee line to Florida; Arkansas has been interested in the route from Little Rock to Memphis; and Georgia has sought legislation for possible toll routes from Augusta to Jacksonville and from Griffen to a point near Chattanooga. Legislation introduced in midwestern states in recent sessions has led to speculation concerning the feasibility of toll roads in Michigan, on the route from Detroit to Chicago; in Minnesota, from Forest Lake to Duluth; in Missouri, from St. Louis to Kansas City; and in Wisconsin, from the Illinois line to Minnesota.

ADMINISTRATIVE AND FINANCIAL PROVISIONS OF TOLL-ROAD LEGISLATION

Generally speaking the financing, construction, and operation of toll roads are responsibilities vested in an

¹⁹ H. B. 2745, 1949.

independent commission or authority created for the purpose by law. Turnpike authorities or commissions usually comprise three to five members appointed by the governor with the consent of the senate. Terms of office range from five to ten years, and in all cases provision is made for staggered appointments. In most cases no compensation other than expenses is provided for. The commissioner of the state highway department is commonly an ex officio member of the toll authority. (See appendix, pages 190-92.)

In Ohio, Maine, and Pennsylvania the turnpike authorities consist of four members plus the director of highways as ex officio member. The four appointed members of the Pennsylvania Turnpike Commission receive compensation, but in Ohio and Maine the Commissioners serve without pay. The New Jersey commission, however, consists of only three members, and does not include the highway commissioner. In Oklahoma the commission includes the governor as an ex officio member, and the four elected members must be from four specified counties. Departures from the general rule of providing an independent authority with or without state highway commission representation are found in Maryland, New Hampshire, and Colorado, where responsibility for toll turnpikes has been conferred on the state highway departments. And in Connecticut a five-member commission appointed by the governor carries out certain administrative functions, including the handling of concessions, but responsibility for toll collection and other finances is left to the state highway department.

Financing provisions contained in toll-highway laws generally specify that revenue bonds shall be issued and

secured by tolls and other revenues collected specifically from the projects constructed, without pledging the faith and credit of the state. In New Hampshire, however, the credit of the state is pledged. Determination of actual toll rates is left to the authority, with the provision that they be set at levels which will meet the various obligations involved in debt service, maintenance, and operation. Typically a time period, ranging from 35 to 40 years, is stipulated beyond which the maturity of the revenue bonds may not extend. Maximum interest rates are generally specified, ranging from 3 to 6 per cent.

In some cases toll-road legislation specifies the maximum amount which may be borrowed for the purpose of constructing such facilities. Specific sums may be appropriated for advance planning, but generally it is provided that the turnpike commission may call upon the highway department for planning and engineering services and advances of funds, both of these to be repaid after issuance of turnpike bonds. Other financial stipulations in toll-road legislation include permission to accept gifts of land and money, and in particular to accept aid from the federal government. Provision is also generally made for the lease of land or buildings on the toll-road right of way for ". . . telephone, telegraph, electric light or power lines, gas stations, garages, stores, hotels, and restaurants."

In some states it is provided that when all of the bonds have been retired, or sufficient revenues accumulated to pay principal and interest, the toll facility will be turned over to the highway department to be included in the state highway system and operated free of tolls. In other states, however, the law reads that after

payment of the bonds issued for a specific highway, tolls may be continued on such highway and the revenues applied to financing other toll facilities.

The extent to which the construction and operation of the toll road is geared into the over-all development of the public highway system varies. Some legislation mentions the specific points that the turnpike shall connect. In Maine, for example, the road was to be built "at such location as shall be approved by the State Highway Commission from a point at or near Kittery in York County to a point at or near Fort Kent in Aroostook County."²⁰ Or, as in New Jersey, the general authority to construct toll roads must be implemented by further legislation designating specific routes. The Ohio legislation illustrates a case in which greater authority is given to the Turnpike Commission "to designate the locations" of the turnpike projects, but with the stipulation that the locations selected be considered "necessary or desirable in the judgment of the Commission and of the director of highways . . ."²¹

Except in states where the toll road is under the jurisdiction of the state highway department, maintenance and operation are the responsibilities of the independent authorities, which provide their own personnel and equipment. Policing by the state is optional in some states, but most legislation requires the toll authority to perform its own policing services.

Such, in brief, are the general outlines of the recent revival of the toll road. In the chapter which follows, the toll-road movement will be viewed against the background of the problem of financing highway development in the United States.

²⁰ Private and Special Laws of Maine of 1941, PL. 69, sec. 1

²¹ Amended S. 7, approved June 1, 1949, sec. 5(j).

CHAPTER II

THE UNDERLYING HIGHWAY PROBLEM

The recent revival of the toll road marked the end of a distinctive cycle in the development of American highways. Just prior to World War II it became apparent that something was amiss in the field of automotive transportation. The motor vehicle had revolutionized the pattern of everyday living and working habits by enabling the individual to supply his own means of transportation. It had developed a national system of bus transportation which was accounting for a major part of our total public carrier passenger movement; and it had profoundly affected methods of production and distribution through the flexibility and economy afforded by the truck. Paradoxically, however, the motor vehicle had contributed substantially to economic waste and personal frustration. Because the highway plant had failed to keep pace with automotive technology and traffic demands, our highway transportation system was failing to provide reasonable standards of efficiency, convenience, and safety.

Wartime interruption of normal highway activities afforded an opportunity for highway administrators to reflect on the long-range implications of this problem. And, in preparation for resumption of postwar programs, many states subjected the entire problem of future road and street programming to intensive study. These inventories of the various states added up to the fact that modernization would require a virtual rebuilding of the highway system at staggering cost. The expected

traffic load was of such volume and composition that transportation economy and efficiency could no longer be achieved by the expedient of adding small increments of capacity to the existing road bed. Rather, major segments of the plant, particularly main intercity highways and metropolitan-area facilities, were obviously in need of drastic redesign and relocation. These discoveries were especially disturbing in view of the fact that during the past three decades more than 60 billion dollars had been expended for construction and maintenance of the road and street system.

We have now entered a new era of highway development. This stage in the physical development of the highway system is characterized by technical standards and capital requirements that make previous concepts totally inadequate. Highway administrators are confronted with a situation analogous to that of an entire industry being overtaken by functional obsolescence. Survival depends on modernization; but in order to modernize, the old tools must be replaced and the entire plant redesigned. Yet in the case of our highways, a vast program of new capital investment is being launched or contemplated on the general assumption that the administrative and financial tools which have failed us in the past will prove equal to the task ahead.

In short, the highway program today tacitly assumes that increases in the general level of existing user charges, and expansion of federal grants, constitute a reliable and equitable method of underwriting highway modernization. Growing doubt regarding the validity of this assumption constitutes one of the motivating forces in the toll-road movement. This chapter will explore the assumption by seeking answers to the follow-

ing questions: (1) How much will it cost to maintain and modernize the highway system? (2) What are the prospects of meeting these requirements with the revenues in sight? (3) Where do the needs bulk largest? and (4) Why have these needs been permitted to accumulate?

MAGNITUDE OF FINANCIAL REQUIREMENTS

Despite more than a quarter of a century of well-defined authority and responsibility in the highway field, it is not yet possible to make a firm projection of the financial requirements for highway modernization. According to a recent report submitted to state highway officials:

With respect to the Nation-wide dimensions of the necessary program of road and street improvement, we have but recently emerged from the period of guesses and "horse-back" estimates. . . . It is impossible at this time to forecast with precision either the physical or the dollar volume of needed improvements.¹

There are several explanations for this situation: variations among the states in the quality of planning work; variations in the jurisdiction of state highway agencies with respect to local roads and city streets; uncertainties as to the future trend in construction and maintenance costs; and the inherent difficulties involved in long-range projection of vehicle ownership and use, affected by population factors, technological change, levels of income, and income distribution. Nevertheless, nationwide estimates have been made by public and

¹ American Association of State Highway Officials, "Preliminary Report of Special Subcommittee for Study of Highway Finance Problems," September 1949. (Mimeographed.)

private agencies, and regardless of the source of the estimates or the methods used, all lead to a common conclusion. It will be impossible to overcome accumulated deficiencies, much less modernize the highway plant in the foreseeable future, unless the current rate of new capital investment is stepped up sharply.

During mid-1949 the chairman of the Congressional Joint Committee on the Economic Report inquired of state government and highway department heads as to the needs for highway construction. The replies to this inquiry revealed that the cost of correcting existing highway deficiencies on all road systems in the nation amounts to 41 billion dollars. It was further estimated as a result of this survey that new deficiencies would be arising during the coming decade in an amount equal to 35 per cent of the total past deficiencies.² In other words, according to this projection between now and 1960 the states and their subdivisions would need to spend for construction alone approximately 55.3 billion dollars to bring the highway system to acceptable standards.

Making allowance for maintenance and operating requirements of at least 1 billion yearly,³ it will be observed that according to this estimate approximately 6.5 billion dollars annually will be required to modernize and maintain the highway system during the next decade.

² Joint Committee on the Economic Report, *Highways and the Nation's Economy*, Joint Committee Print, 81 Cong. 1 sess., p. 4. This estimate assumes that the index of construction costs would remain at the 1948 level.

³ Maintenance expenditures alone amounted to nearly 1.2 billion dollars in 1948.

Another attempt to measure the construction requirements of the highway system has been made by the Bureau of Public Roads. This estimate was designed to indicate required construction and maintenance expenditures over a 15-year period. On the basis of 1948 prices, it was indicated that an aggregate of 55.1 billion dollars would be required for construction, with an additional 1.4 billion dollars a year for maintenance. (See table on page 27.) This would mean a total of 5 billion dollars for construction and maintenance annually. Further estimates of administration, operation, and debt service requirements added approximately 453 million dollars a year to the bill. Assuming no change in construction costs, annual requirements would be somewhat over 5.5 billion dollars. The Bureau assumed, however, that the price level would gradually decline to about 50 per cent above the prewar average, reducing annual requirements to 4.4 instead of 5.5 billion dollars.⁴

A third projection of financial requirements, by a committee of the American Association of State Highway Officials, reviewed estimates of other groups and attempted to check them by reference to more comprehensive studies which have been conducted in 17 states since the end of the war. These states have made intensive engineering and financial surveys of highway requirements, in most instances going to out-of-state agencies for technical assistance. In attempting to use the result of these studies as a basis for nationwide estimates, however, the Committee of State Highway Officials found wide variations in coverage, and sur-

⁴ The 1948 price level was approximately double the 1937-41 average.

THE NATIONWIDE PROGRAM OF HIGHWAY NEEDS^a

ITEM	Primary rural ^b roads	Second- ary and local roads	City Streets	Total
Miles in service (In thousands).	342	2,658	300	3,300
Annual travel on system (estimated current annual rate in billion vehicle-miles).....	152	48	200	400
Highway Needs (In Millions of Dollars)				
Capital improvement needs at 1948 prices:				
Immediate capital needs.....	\$18,100	\$ 9,300	\$19,500	\$46,900
Additional capital needs (next 15 years) ^c	3,200	1,600	3,400	8,200
Total.....	\$21,300	\$10,900	\$229,00	\$55,100
Average annual program at 1948 prices:				
Average annual capital needs (15-year program).....	\$ 1,420	\$ 730	\$ 1,530	\$ 3,680
Average annual maintenance needs.....	420	720	260	1,400
Total.....	\$ 1,840	\$ 1,450	\$ 1,790	\$ 5,080
Average annual program, ad- justed to probable future price level: ^d				
Capital needs.....	\$ 1,100	\$ 570	\$ 1,200	\$ 2,870
Maintenance needs.....	330	560	200	1,090
Total.....	\$ 1,430	\$ 1,130	\$ 1,400	\$ 3,960
Program cost per vehicle-mile..	\$0.0094	\$0.0235	\$0.0070	\$0.0099

^a Estimate as of Oct. 15, 1948 prepared in Highway Cost Section, Bureau of Public Roads, Fred B. Farrell, Chief. This estimate is subject to modification as data on highway needs accumulate to form the basis of a more accurate analysis.

^b Primary rural state highway systems.

^c Stopgap improvements, replacements, and so forth, established at 17.5 per cent of the immediate needs for a 15-year period.

^d The 1948 price level was approximately 200 per cent of prewar (1937 to 1941). It was estimated that prices would gradually recede to a value 50 per cent above prewar.

veys in only 6 states revealed sufficient uniformity to permit direct comparison of results and some degree of generalization.⁵

By general application of the controlling findings of these 6 studies, the resulting estimate of nationwide highway needs was found to vary from 4 to 5.6 billion dollars annually programed over a 15-year period.⁶ Although stating that "it would be foolhardy to draw any clearcut conclusions from this showing . . ." the Committee goes on to observe that "it is reasonable to state, however, that such evidence as could be marshalled in a superficial analysis of the results of these studies indicates a required nationwide program of the same general dimensions" as that arrived at by the Bureau of Public Roads (noted above).

It may therefore be concluded from the evidence at hand that construction outlays in the order of 5 billion dollars annually would be required during the next 10 to 15 years to bring the nation's road and street system to acceptable standards for safe, convenient, and economical motor transportation. To that sum would be added about 1.5 billion dollars for maintenance, operation, and debt service.

There is little likelihood that deficiencies of this magnitude could be overcome under current arrangements for highway support. At present less than 1.5 billion

⁵ Some surveys covered only state highway systems. Others considered all rural roads but omitted city streets. Other variations included the time period for which estimates were made, methods of analysis, and governing assumptions.

⁶ American Association of State Highway Officials, *Preliminary Report of the Special Committee for the Study of Highway Finance Problems*, September 1949.

dollars per year is available for highway construction at all levels of government. Even if it were feasible to apply a construction fund of 1.5 billion dollars annually in accordance with scientifically determined priorities, it would require nearly 30 years to eliminate the 41 billion dollars of existing deficiencies. But during this 30-year period new deficiencies would also be arising at the rate of 1.5 billion dollars annually. These new deficiencies would in effect offset the modernization program, and despite the effort to bring the highway plant to acceptable standards it would continue at about the current level of obsolescence.

CONCENTRATION OF NEEDS ON MAJOR SYSTEMS

The magnitude of the highway financing problem is not adequately reflected by comparing total needs with total revenues. What makes the problem more difficult is that highway needs are concentrated on particular segments of the highway system, whereas restrictions governing the expenditure of highway funds ordinarily make it impossible to concentrate highway construction activities where the needs are greatest. Restrictions preventing a concentration of roadbuilding activity on a limited system of roads or a continuous stretch of road take the form of legal formulas governing the allocation of funds, which in turn are the result of political pressures for state-wide distribution of available revenues. Because of these conditions, the most serious accumulation of deficiencies is found on the nation's most congested traffic arteries.

The concentration of highway traffic is illustrated by

the situation on the federal-aid system. The rural portion of the federal-aid primary system accounts for only 7.5 per cent of rural road mileage but carries over 60 per cent of motor vehicle traffic in rural areas. The urban portion of the federal-aid primary system represents less than 5 per cent of total urban mileage yet carries over 20 per cent of the traffic generated in urban areas. Only 13.5 per cent of rural road mileage is accounted for by the federal-aid secondary system, yet this limited mileage carries about 25 per cent of the motor vehicle travel in rural areas. Together these three systems represent only 19 per cent of all road and street mileage in the country, but they carry more than 50 per cent of the nation's motor vehicle travel, and their modernization would require 29 billion dollars of construction. At the current rate of expenditure on these systems it would be about 1990 before federal-aid highways could be brought up to what is considered an adequate standard of development today.⁷

Another measure of the concentration of needs and the lag between such needs and prospective revenues is supplied by the situation on the Interstate System, which comprises about 37,000 miles of trunk-line highways forming "the most important connected network within the highway system of the country. . . ."⁸ This selected system of high density arteries contains only 1 per cent of the total road and street mileage of the country yet accommodates about 15 per cent of all

⁷ *An Estimate of Needs of the Federal-aid Systems as of December 31, 1949*, a report prepared under the direction of a Special Subcommittee of the American Association of State Highway Officials, March 1950, p. 4.

⁸ *Highway Needs of the National Defense*, H. Doc. 249, 81 Cong. 1 sess., p. 2.

motor vehicle travel.⁹ The estimated cost of improving the system to currently accepted standards is approximately 11.3 billion dollars.¹⁰

At the moment there is no prospect that this system can be improved within a reasonable period of time. Because of the pressure for federal-aid improvements on other federal highways, both urban and rural, there has been no specific allocation of federal funds for this system. Instead, the states may allocate such amounts from the primary and urban federal-aid funds as they desire. Under this arrangement federal funds are being assigned to the interstate system at a rate of only \$75,000,000 a year, matched by an equal amount of state funds. At this rate of federal-aid construction it would take 100 years to complete the interstate job.¹¹

REASONS FOR ACCUMULATED HIGHWAY NEEDS

The striking disparities between estimated capital requirements and prospective revenues give rise to several important questions: First, how is it possible that deficiencies of such magnitude have accumulated in view of the fact that nearly 60 billion dollars have been spent for highway construction and maintenance in the past three decades? Second, if the current estimates of capital requirements accurately reflect the demand of motor vehicle users, why is it not feasible to provide the im-

⁹ This figure is based on vehicle miles operated. The actual relative importance of the system, therefore, is understated since heavy-duty trucking and intercity truck operations tend to concentrate on the main arteries. Calculated on the basis of the more significant standard of ton-miles operated, the interstate system, therefore, carries a considerably heavier portion of total traffic than indicated by the vehicle-mile figure of 15 per cent.

¹⁰ Calculated on the basis of construction prices prevailing in 1948.

¹¹ *The Federal-Aid Highway Act of 1950*, Pub. 769, 81 Cong. 2 sess., makes no special allocation for the interstate highway system.

proved facilities by appropriate increases in user charges without resort to toll-road financing?

The magnitude of today's highway requirements results from a number of long-standing trends as well as more recent postwar conditions. The problem faced at the beginning of the automotive age was how to produce a vehicle that could compete with the horse and wagon. There was no occasion for great concern over the lack of adequate highways until the motor vehicle had proved itself capable of supplying dependable and economical transportation service. Until the end of World War I, therefore, major effort in the field of highway transportation was directed toward building durability and reliability into the vehicle, and toward developing production processes which would reduce costs. As soon as these objectives were in sight, the demand for hard-surfaced roads became urgent. But the spectacular expansion of automobile ownership and use which followed left little time for careful highway planning or orderly development. In the race to furnish the new vehicle with ways to get about, it was not a question of building roads adequate for the future, but of providing usable facilities for immediate requirements.

The approach taken to meet this demand appeared to be the only one feasible at the time. Highway officials started with what was at hand, straightened and widened wagon roads here and there, and hoped that what had proved adequate for the vehicle of the past would serve as a good beginning for the requirements of the future. But the course of expediency resulted in perpetuating with relatively permanent surfaces a network of roads destined to prove totally inadequate in width, alignment, and other major respects.

Between 1920 and 1940 the combined construction

program of federal, state, and local governments resulted in the surfacing of a million miles of highways. In terms of speed and physical dimensions this was an impressive accomplishment, but in view of the trends in traffic volume, highway congestion, and accidents which were already evident during the period, much of this effort reflected inadequate consideration of probable future requirements. By the time it became evident that functional obsolescence had overtaken a large portion of the road and street system, homes and businesses had grown up along the narrow and unprotected rights of way to form continuous ribbons of roadside encroachments. When redesign and reconstruction became essential to accommodate the continuing rise in traffic volume and speed, the land and damage costs involved in widening and straightening these inadequate rights-of-way had risen to exorbitant levels. Failure to buy up the necessary land to ensure economy in any future expansion of the facilities, and failure to protect the right of way by controlling access, had in effect frozen much of the highway system to the designs hastily adopted from the original horse and carriage roads.

A second basic error of public policy resulting from the urgency of the early highway program was the almost complete disregard of urban highway problems. When the demand for improved automobile roads first developed, most of our cities had a considerable mileage of surfaced streets. The immediate problem therefore was in rural areas. But the expedient of the initial concentration on rural requirements to the virtual exclusion of the city later became permanent policy in many states. Only in recent years has a reversal of this position been evident.

Coupled with the neglect of the city was the failure

to consider parking and terminal requirements as part of the highway transportation problem. The fact that curb space had proved adequate to meet the parking needs of the horse and buggy led to the assumption that the same arrangements would accommodate the automobile and the truck. This assumption, in so far as public policy is concerned, continues to govern in highway planning.

Despite these conditions widespread ownership and use of the private automobile has continued to facilitate the dispersal of population from the central parts of large cities to outlying areas and has brought about a shift from mass transportation to individual transportation by motor vehicle. As a result, the congestion problem in urban areas has become critical.

In addition to the accumulated obsolescence and physical deterioration that had appeared by 1940, several other factors aggravate today's problem of highway modernization. As in other civilian activities, wartime scarcities imposed a practical moratorium on highway construction. Also, many segments of the system suffered physical deterioration from heavy war traffic and inadequate maintenance because of shortage of labor and materials. Continuing shortages in the immediate postwar period, combined with the inherent difficulties of getting large-scale construction projects under way, added further to the accumulated deficiencies of the prewar system.

Removal of gasoline and tire rationing and prompt reconversion of the automotive industries to the production of civilian vehicles produced a sharp increase in postwar highway use, and this increase was magnified by the rapid growth of income and population which

had taken place during the decade of the 1940's. Motor vehicle registration by 1951 exceeded the 1940 level by more than 40 per cent; and highway use, as measured by vehicle miles traveled, had risen at somewhat sharper rates. Thus an unprecedented traffic load was thrown on the already obsolete highway system before the wartime deterioration in the plant had been overcome.

The most significant aspect in the postwar upsurge in traffic, however, is found not in the aggregate increase in vehicle miles operated but in the radical changes that have occurred in the composition of the traffic. Heavy duty and characteristically slower-moving trucks are using an increasing share of available highway capacity. Between 1941 and 1948, miles of travel by passenger vehicles on main roads increased 11 per cent, whereas miles operated by trucks increased 18 per cent. This increase in truck traffic, however, was far greater with respect to the heaviest trucks. During the same period, and on the same system of main roads, miles operated by single unit trucks (characteristically light vehicles) increased only 9 per cent, while operation of truck combinations (characteristically heavy vehicles) increased 54 per cent.

These figures of mileage traveled, however, do not provide a full measure of the trend toward heavy-duty use of the highways for trucking operations. A more accurate gauge is furnished by ton-mile data. Between the same two years (1941 and 1948) ton-miles carried by single-unit trucks on main rural roads decreased 21 per cent as contrasted with a 69 per cent increase in ton-miles moved by truck combinations. This pronounced rise in the use made of our main roads by truck combi-

nations is the product of three factors: the sharp increase in the number of such vehicles; a much higher annual average mileage than for the other types of vehicles; and sharp increases in the load carried per vehicle.

The increase in load per vehicle is reflected in both gross weights and axle loads. Wartime relaxation of state size and weight restrictions to permit full use of available carrying capacity apparently established a pattern that has been carried into the postwar period. In the period 1936-38 only slightly more than 40 out of every thousand trucks and combinations using the highway carried loads of more than 30,000 pounds, compared to 140 out of every thousand in 1947. In the pre-war period only 3 out of every 1,000 trucks carried gross weights of 50,000 pounds or more as against 15 for the year 1947. The trend of the frequency of heavy axle loads has followed a similar pattern. Thus in the prewar period 1936-38 only 13 out of every 1,000 trucks and combinations had axle loads of 18,000 pounds or more. In 1947 this figure had increased 6 times to 75 per thousand.¹² Efforts to make realistic adaptation to this trend by more liberal state laws governing permissible loads have not succeeded in controlling abuses. According to a recent report:

A survey by the American Trucking Associations, Inc. indicates that since 1943 thirty-eight states have liberalized their weight laws, with the result that trucks of much larger capacity are now moving over our highways. Some truckers, however, appear to interpret each upward re-

¹² All of the above data on traffic trends, sizes, and weights are taken from H. Doc. 249, 81 Cong. 1 sess., pp. 80-86.

vision of permissible weights as implied permission to run even greater loads, illegally.¹³

Highway officials are becoming apprehensive over the sharp upturn in the physical burdens being imposed on the highways. The U. S. Commissioner of Public Roads recently observed:

. . . We are overloading our highways in their traffic volume capacity and in their structural capacity. There is more than ample proof. The overloading of safe capacity by numbers and by driver misuse is reflected in the accident record. The overloading of safe structural capacity is reflected in the skyrocketing maintenance and reconstruction costs.¹⁴

The American Association of State Highway Officials points out that ". . . the problem of sizes and weights is brought about largely through a very small percentage of the vehicles operating over the nation's highways—roughly about 2 per cent."¹⁵ But a resolution recently adopted by the Association indicates the importance which highway officials attach to this small segment of the trucking industry:

Notwithstanding the very liberal maximum standards formulated and promulgated by this Association relative to highway vehicle sizes and weights particularly to the recommended maximum single axle load of 18,000 pounds, great damage to our highways has resulted from the failure of some highway users to respect and comply with these well-considered standards. . . . This ruinous practice of

¹³ The Council of State Governments, *Highway Safety—Motor Truck Regulation* (1950), p. 61.

¹⁴ Address of Thomas H. MacDonald, U. S. Commissioner of Public Roads, before American Road Builders' Association, Feb. 7, 1949.

¹⁵ *Report of the Subcommittee on Overloads*, presented at Annual Convention of American Association of State Highway Officials, San Antonio, 1949.

overloading our roads is destroying our primary highways faster than we can rebuild or replace them. . . .¹⁶

In addition to the problem of highway obsolescence and depreciation and the rapidly increasing burden imposed on the road system by the greater volume and heavier weight of traffic, those responsible for highway modernization must deal with the problem of spiraling costs. The highway construction dollar has lost approximately one half of its prewar purchasing power, and the cost index for maintenance work has increased some 80 per cent. To this basic increase in unit cost must be added the two considerations noted above: first, that current highway deficiencies bulk largest in the areas where costs are normally highest (because of real estate values and costly structures); and second, that accelerated maintenance requirements have resulted from heavier use of physically inadequate facilities.

Finally, there is a strong disposition on the part of most states to finance their highway programs on a pay-as-you-go policy rather than to incur long-term debt. This disposition is further strengthened in a number of states by strict limitations on state borrowing. For the most part then, the attempt is being made to meet today's extraordinary highway requirements out of current revenues. Rates of highway taxation, however, have not been raised sufficiently since the end of the war to compensate for rising costs, let alone to cope with the requirements of reconstructing large segments of the highway system. Thus a growing gap has been created between the demand for construction and maintenance dollars and their availability. In combination these are

¹⁶ "Resolution No. 1 on Highway Vehicles, Sizes and Weights," adopted at Annual Convention, American Association of State Highway Officials, San Antonio, 1949.

the factors which underlie the highway problem today.

Assuming that the estimates of highway needs cited above are not unduly inflated by faulty estimates or promotional bias, the questions to be answered are apparent. If modernization of the type and magnitude depicted in the official estimates reflects the true needs of highway users for economical, safe, and convenient facilities, how are these requirements to be met? To what extent is the toll road an effective method of coping with this problem? And what obstacles stand in the way of a prompt adjustment of our traditional system of financing highways to provide the funds necessary to accomplish the task at hand?

SIGNIFICANCE OF THE TOLL-ROAD MOVEMENT

Reappearance of the toll gate on American highways is potentially of much greater significance than is indicated by the limited mileage of projects now in operation. The number of states in which toll roads are authorized, planned, or under way, and the number in which authorization may be sought in the current sessions of the state legislatures indicate a significant trend. The development is of recent origin and will tend to gain momentum if the present facilities show good prospects of financial success. Moreover, the role of this new approach to highway finance takes on special importance in the highway program because of the nature of the facilities involved. The most promising location for toll roads is in areas of extremely high traffic density. To accommodate such volumes of traffic with speed and safety, design standards must be of the highest type involving heavy construction costs per mile. The New Jersey Turnpike, for example, located in the line of one of the heaviest highway traffic movements in the

country, is scheduled to cost approximately 1.6 million dollars per mile. Most of the potential toll-highway routes are on the rural sections of the interstate highway system which comprise only 1 per cent of the rural road mileage in the United States but serve approximately 20 per cent of the traffic carried on all rural roads.¹⁷ It will therefore not be necessary for the toll-road movement to attain any substantial proportions from the standpoint of road mileage in order to become an important factor in service to traffic as well as in highway planning, administration, and finance.

It is apparent, then, that even a limited growth of the toll-road movement will create serious policy issues and administrative problems. For since even the most articulate proponents do not advance the toll-road device as a universal substitute for conventional methods of highway administration and user support, ways must be found to accommodate two distinctive methods of dealing with the highway problem. Those responsible for legislative policy decision and normal administration will be confronted with a novel set of issues:

1. Will the programming of toll roads make it difficult for established highway authorities to formulate sound long-range plans for developing the remaining portion of the highway system?
2. Will it be possible to avoid overlaps and conflicts in jurisdiction as between turnpike authorities and existing highway agencies?
3. Can duplication of facilities and capital investment be avoided?
4. Is double taxation of users inherent in the system of toll financing?

¹⁷ *Highway Needs of the National Defense*, H. Doc. 249, 81 Cong. 1 sess., p. 1.

5. Will it be possible to reconcile the traditional concepts of financing highways with the essential requirements for satisfactory toll-road operation?

The disproportionate significance of the toll road from the standpoint of costs involved and traffic served underlies the intense controversy and sharp difference of opinion among public officials and the highway transportation industry regarding the merits of toll roads as one solution to the problem of highway modernization. An official of the American Automobile Association, presumably reflecting the views of three million members, has labeled toll financing as a "return to eighteenth century thinking." "Tolls failed then as a highway financing method and they will fail again."¹⁸ In sharp contrast, the Keystone Automobile Club has been an influential supporter of the Pennsylvania Turnpike and its extension.

Spokesmen for agricultural interests are equally divided. The Ohio Farm Bureau has stated that from the farmer's viewpoint, the toll-road movement is both uneconomic and undemocratic, while the Associated Farmers of California in 1947 submitted a proposal that California investigate the possibility of a statewide development of toll roads in preference to the extensive free-road program recently enacted.

The National Highway Users Conference has taken the position that "toll roads aren't the answer" stating that: "One toll road won't wreck this system [the existing system of so-called free roads]. Scattered toll roads will not hurt it much. But a toll road epidemic won't stop at one or a dozen toll roads. We must stop this

¹⁸ American Automobile Association, quoted in National Highway Users Conference, *Why the Toll Method of Financing Roads Is Unsound*, January 1949, p. 2. More recent policy statements by the AAA acknowledge a limited role for toll finance.

epidemic now, in the places where we can reach it."¹⁹

Commercial truck and bus operators contend that the toll-road development is unsound because it will increase the cost of service to the consumer. Thus a spokesman for the trucking industry has stated that:

Fees from truck operators are relied on by toll roads for much of their revenue. Yet trucks must keep their costs down if truck service is to remain available to the public at a reasonable price and so they would be impelled to use toll roads only when good free roads were not available. What does this mean? It plainly means that a state hoping to attract truck traffic to its toll roads will have to restrict improvements of its parallel free roads. Yet it is for good free roads that highway users already pay enormous taxes.²⁰

Federal policy as expressed through the Federal-aid Highway Act has consistently opposed the toll-road principle with minor exceptions for specialized bridge and tunnel projects. This legislation prohibits the establishment of toll gates on any highway that has received financial aid from the federal government. In line with this policy an official of the Bureau of Public Roads has recently stated:

. . . I am one of many who contend that precisely in the case where it is deemed feasible to finance a particular highway by direct toll collection, it is unwise, as a matter of public policy, to do so.

I also object, on the grounds of equity, to the practice of augmenting general tax revenue for highways by direct toll collection on particular highways.²¹

¹⁹ National Highway Users Conference, *Highway Highlights*, October 1948, p. 4.

²⁰ John V. Lawrence, Managing Director, American Trucking Associations, Inc., quoted in National Highway Users Conference, *Why the Toll Method of Financing Roads Is Unsound*, p. 2.

²¹ H. S. Fairbank, Deputy Commissioner, Bureau of Public Roads,

The national government has nevertheless been instrumental in the revival of the toll-road movement. Over 40 per cent of the original cost of the Pennsylvania Turnpike was covered by an outright gift from the federal government through the Public Works Administration. Moreover, the original turnpike bond issue amounting to about 41 million dollars was sold to the Reconstruction Finance Corporation. Thus the entire underwriting of the Pennsylvania Turnpike was done by the federal government. According to the Pennsylvania Turnpike Commission "this superhighway would never have been built" without federal financing.²²

The wide differences of opinion concerning the desirability of toll roads among groups with a community of interest in the development of highway transportation suggest the need for more thorough examination of the toll-road movement to determine the facts and circumscribe the areas of agreement and disagreement among supporters and opponents of the toll road. In the following chapters an attempt is made to establish the facts by studying the circumstances underlying the highway problem today, and the conditions which have led to the toll method of coping with this problem. With this factual background, it will be possible to evaluate more carefully the arguments which have been offered for and against this approach to the highway problem and to appraise the possibilities of revising current state and federal policy along lines which might provide an alternative to the toll-road solution.

"The Case Against Toll Roads," a paper presented at a meeting of the Highway Division of the American Society of Civil Engineers, New York City, Jan. 23, 1948, p. 1. (Mimeographed.)

²² National Highway Users Conference, *Why the Toll Method of Financing Roads Is Unsound*, p. 11.

CHAPTER III

FACTORS IN THE TOLL-ROAD MOVEMENT

The previous chapter has described the magnitude of the highway modernization problem today and some of the major reasons contributing to the current situation. The next step is to examine some of these conditions as they obtain in states where toll highways have been authorized, to indicate the relation between the application of toll finance and the physical and financial difficulties facing the highway industry.

The reasons that a state resorts to tolls as a means of financing needed highway improvement are frequently set forth in toll-road legislation itself. Such description varies from generalities concerning the desirability of toll facilities for general commerce and welfare to more specific declarations of the need for improved facilities on designated routes. Other reasons which have been cited include the provision of employment, the elimination of congestion, and the reduction of hazards and highway accidents.

The Maryland law is typical of legislation based on general objectives. The purpose of the legislation was stated to be the "removal of handicaps and hazards on the congested highways of the state, the promotion of agriculture and industry, and the provision of modern transportation facilities." The New Jersey and Ohio laws cite similar objectives. The building of the Pennsylvania Turnpike, it has been noted, was stimulated to a major degree by the problem of providing useful work at that time. Toll-road legislation in Illinois was likewise

related to the problem of providing employment, but in this case concern was directed to the unemployment anticipated at the cessation of World War II. In the words of the statute, the Illinois State Superhighway Commission was established

. . . to promote the public welfare, to assist postwar readjustment by providing employment and the means of earning a livelihood to persons returning from service with the armed forces, and to facilitate vehicular traffic by providing convenient, safe and modern highways designed for the accommodation of the needs of the traveling public through and within the State of Illinois. . . .¹

In a number of states the decision to build toll roads has been influenced by similar undertakings in nearby states. Legislation establishing the Massachusetts Turnpike Commission cited as a reason the fact that "neighboring states are constructing or have completed construction of connecting express highways to the several boundary lines of the Commonwealth."² When toll-road legislation was introduced in Kentucky in 1949, the sponsor of the bill stated that the proposed roads would form connecting links in a proposed superhighway from Chicago to Atlanta.³ The New Hampshire legislature approved the imposition of tolls "to provide an adequate and safe facility for the increased volume of express trucks, busses, and automobiles that will follow the opening of the express highway now under construction in the State of Maine. . . ."⁴ Similarly, legislation in North Carolina in 1950, proposing a north-south turnpike, was introduced with the hope that such a facility

¹ S. 528, approved July 9, 1943.

² H.R. 2745.

³ *Bond Buyer*, Jan. 24, 1948, p. 8.

⁴ H.B. 354, 1947.

might be connected with the West Virginia toll system to provide improved transportation from North Carolina to the Middle West.⁵

Still other considerations have been mentioned as contributing to the justification of toll finance. Investigation of possible toll-road routes in Arkansas was directed to areas in which difficult terrain resulted in prohibitive construction costs. In Michigan it was stated that "financing superhighways with revenue bonds . . . would release millions of dollars of motor vehicle revenues for other worthwhile projects."⁶ In New York the governor's Thruway Committee asserted that use of the Thruway "will result in actual dollar savings in motor vehicle operating costs."⁷ As examples of anticipated savings, it was declared that the cost of moving an average truckload of milk from upstate to New York City would be reduced by \$28, and that a saving of \$100 could be made in shipping a truckload of metal products from New York City to Buffalo.

For the most part, however, toll-road legislation itself provides only a partial indication of underlying reasons, and further evidence must be obtained by observing actual conditions in the state. In most cases the evidence is the same: an accumulation of road needs in excess of revenues currently available for modernization, and a variety of obstacles to taking the necessary steps to correct the situation within the existing pattern of highway administration and finance. Among these obstacles are opposition to increasing highway user taxes, prohibitions against borrowing, or ill-advised programming of available revenues. The ultimate decision

⁵ *Bond Buyer*, Mar. 4, 1950, p. 6.

⁶ The same, Jan. 22, 1949, p. 4.

⁷ *Report of the Governor's Thruway Committee*, Mar. 4, 1950.

favoring toll finance may also be influenced by other factors, such as the desire to assess out-of-state traffic.

The discussion which follows is concerned with some of the specific conditions found to exist in states which now have the authority to construct toll roads or which have had such plans under consideration.

CONDITIONS FAVORING MAINE TURNPIKE

Factors underlying the development of a toll road in Maine were long-standing problems of finance which were preventing needed highway modernization of the State's most congested highway, U. S. Route 1. Basically the problem of U. S. 1 stems from the fact that Maine is a sparsely populated state with relatively few motor vehicles, and yet so situated geographically that heavy out-of-state traffic must be accommodated during the summer vacation season, particularly in the southeastern section. With fewer than 900,000 people and approximately 250,000 vehicles, the state realizes an income for road purposes insufficient to cope with the highway financing problem.

Roads throughout the state have for a number of years been extremely inadequate. In 1947 a study of Maine's highway needs concluded that out of nearly 21,000 miles surveyed, 13,000 miles were deficient, or some 60 per cent of the mileage in the state. In addition, 2,500 structures out of 4,100 were reported to be below tolerable standards.⁸ The cost of remedying these deficiencies was estimated at 164 million dollars.

Income for highway purposes from all sources in 1947 including federal aid was 23.4 million dollars. The

⁸ *Maine Highway Needs*, Report to the 94th Legislature by the Maine State Highway Commission in co-operation with the United States Bureau of Public Roads (1949), pp. 46, 47.

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fuel tax was 6 cents and the average for passenger car fees was \$20.⁹ Receipts from these taxes and from all other sources and the purposes for which these funds were expended are shown in the table below.

HIGHWAY REVENUES AND EXPENDITURES IN MAINE, 1947^a

Source of Revenue	Millions of Dollars	Per Cent	Type of Expenditure	Millions of Dollars	Per Cent
Licenses.....	\$ 4.6	20	Maintenance.....	\$13.6	58
Gas Tax.....	8.9	38	Construction.....	8.2	35
Property Tax....	7.4	32	Administrative...	0.5	2
Federal Aid ^b	2.0	8	Other.....	0.6	3
Other.....	0.5	2	Interest.....	0.5	2
Total.....	\$23.4	100	Total.....	\$23.4	100

^a Maine State Highway Commission, *Maine Highway Needs*, (1949), pp. 25, 33.

^b Federal aid to Maine in 1947 was actually about 4 million dollars, but only 2 millions were used due to the difficulty of getting under way with the postwar construction program.

At the time the Maine Turnpike was begun therefore some 8.2 million dollars a year was available for road construction, to meet accumulated deficiencies of 164 million dollars. The difficulty of financing needed modernization of the highway system is not adequately measured by this comparison, however, since the amount of money available to the state in any one year cannot be applied to the particular parts of the system presenting the most urgent deficiencies. State law provides that there should be an "equitable" distribution of highway funds to the various counties, and, to achieve this goal, the division of construction funds among the 16 counties has been made on the basis of population and

⁹ Only 4 states had a higher gas tax, and only 5 states had higher registration fees per passenger car.

federal-aid road mileage in each county. This distribution formula has the basic defect of giving no weight to traffic, and has therefore failed to reflect the greater construction needs of the heavily traveled roads in the southeast part of the state. Moreover, the distribution of a limited annual construction fund among all the counties has meant that insufficient money is available to construct any considerable mileage in one place; that instead the construction program has provided for a few disconnected miles in each county.

The effect of these policies on the problem of modernizing the inadequate and heavily traveled U. S. Route 1, which the Maine Turnpike was built to relieve, has been apparent for some time. Twenty years ago the widening of this road south of Portland was begun in order to accommodate the heavy peak loads created by summer vacation travel to Maine resorts from the states to the south. Since only small portions of this program could be financed in any one year, there was little possibility of any major improvements, and least of all of relocating the road. Accomplishments consisted of widening on the same location, involving a fraction of a mile or a few miles at the most. There was no possibility of by-passing the numerous towns which constitute the principal bottlenecks on this route.

Under these patchwork conditions, Route 1 has been widened to three-, four-, and five-lane widths in various sections, none of it designed as a divided highway. There has been very little improvement in alignment, and twenty years have not brought any part of the road to design standards adequate to accommodate high-density motor traffic. Grade separation, for example, has not been provided at any of the 76 important intersections between Kittery and Portland.

Although it was apparent that any acceptable solution required the by-passing of urban areas lying along the route, the affected towns offered concerted opposition. To this political opposition was added the fact that even if the removal of the highway to a new location had been possible, there was no adequate provision in Maine for controlling highway access.¹⁰ Thus the relocation of the highway would have been accomplished at the risk of creating new roadside encroachments which would in turn interfere with effective traffic movement. In view of these conditions, the possibilities of improving Route 1 to acceptable standards were not promising.

Even if these problems could have been solved eventually, the inability to incur highway debt without an amendment to the constitution introduced another obstacle. All major construction work on the primary system of Maine has been accomplished through the federal-aid program and the sale of bonds. Cumulative issues of state highway and bridge bonds reached 25.6 millions in 1933, and in 1935 the highway debt limit was increased to 36 millions. The provision was made, however, that bonds could not be reissued once they had been retired, so that in 1947, although only 10 million dollars of bonds were outstanding, it was not possible to increase the debt without an amendment to the constitution.¹¹

Construction activity is therefore virtually confined to the federal-aid program. The possibility of obtaining

¹⁰ Chap. 283 of the Public Laws of 1939 had provided that the governor and council could direct the Highway Commission to construct a freeway, with the special authorization of the legislature. Thus it was still necessary for legislative approval prior to the adoption of such design. It was not until a decade later that adequate legislative provision was made for access control. Chap. 400, Public Laws of 1949.

¹¹ Maine State Highway Commission, *Maine Highway Needs*, p. 34.

popular support for amending the constitution to provide for bond financing of a short section of Route 1 was considered to be out of the question, since this route is of direct concern to only two counties. Opposition to borrowing was especially strong since the problem of Route 1 had to a major degree resulted from peak-load conditions created by out-of-state traffic; and it was contended that such traffic, especially from Massachusetts to southern Maine resorts on week ends, was making insufficient payment for the use of Maine roads. This condition resulted in part from the fact that Massachusetts has a gasoline tax of 3 cents per gallon, compared to 6 cents in Maine, so that it was generally more economical to fill up before leaving Massachusetts. In addition, transient passenger cars pay no registration fee, and while reciprocity is provided to permit the residents of one state to visit another, the "balance of travel" favors those traveling to Maine from other states. The out-of-stater in Maine accounts for far more travel volume than does the Maine resident traveling in other states.

In view of these conditions the possibilities of relocating and redesigning Route 1 to acceptable standards within a reasonable period of time were remote. The alternative decided upon to provide immediate relief on this route was to borrow the necessary capital for the construction of a new parallel highway through the issuance of revenue bonds which would not require a change in the constitution to make available the full faith and credit of the state. Paying off the loan through tolls collected from the users also provided a feasible way to assess out-of-state vehicles. Furthermore, construction of a toll road offered a means of assuring limited access design and of providing a through traffic

facility which could by-pass urban areas along the route without political interference.

THE PROBLEM IN NEW HAMPSHIRE AND NEW JERSEY

The decision to resort to toll financing in New Hampshire was based on factors similar to those found in Maine, except that no constitutional debt limit was involved. The cost of overcoming deficiencies on rural and municipal highways in New Hampshire had been estimated at 106 million dollars.¹² This was said to represent the cost of construction for roads and structures conservatively estimated as "not tolerable for today's traffic." The figure does not include either the cost of normal annual replacements or the annual cost of maintenance.¹³ This 106 million-dollar construction requirement is in contrast to total New Hampshire highway expenditures of 14.5 million dollars in 1947, of which only 3.5 million dollars was available for construction.

The 7.5 million dollar turnpike contemplated from the Massachusetts border to Portsmouth, therefore, represented twice the annual road construction budget of New Hampshire, for a section of highway only 14 miles in length. Under these circumstances there was no possibility of building such a road in a reasonable time with current revenues, and the alternative of a bond issue to be paid off through motor vehicle taxes posed the problem of requiring state-wide support for a concen-

¹² As of September 1948 the cost of rehabilitating Route 1 alone, as submitted to the Bureau of Public Roads by the New Hampshire Highway Department, was \$9,159,000 for construction and \$3,230,000 for right of way, or a total of \$12,389,000 for the 14 miles.

¹³ New Hampshire State Highway Department, *Highway Needs in New Hampshire* (1948), pp. 37-38. Financial needs are expressed in 1947 dollars.

tration of vehicle tax revenues on a very limited section of the state's highway mileage. There was also an awareness of the fact that the route is traveled to an important degree by out-of-state vehicles, a condition suggesting direct toll charges as a means of holding such traffic accountable for its share of the costs incurred.

In New Jersey the decision to construct a toll highway stemmed from a combination of heavy traffic, extensive road modernization requirements, inadequate current revenues, and the probability that neither an increase in highway user tax rates nor removal of the constitutional limitation on borrowing would be acceptable.

New Jersey, which is the second most densely populated state in the nation, has a state highway system which represents only one-sixteenth of the total road mileage of the state, but carries one third of the traffic in New Jersey. During the war, the New Jersey Highway Department prepared a comprehensive plan for adding to the capacity of this overburdened main road system by more than doubling its mileage. The cost of providing the added mileage, which was to be accomplished over a 30-year period, was at that time estimated at 750 million dollars.¹⁴ Later in 1947 a report of the State Highway Department estimated the cost of the 30-year program at one billion dollars, and owing to the tremendous increases in both the volume and weight of postwar traffic it was stated to be "imperative that some \$600 million be made available without delay."¹⁵

With respect to the finances available for such a pro-

¹⁴ Sigvald Johannesson, *A Comprehensive State Highway System*, New Jersey State Highway Department, June 15, 1944.

¹⁵ Sigvald Johannesson, *Five Year State Highway Construction Programs*, New Jersey State Highway Department, Sept. 4, 1947.

gram, it was estimated that highway revenues, available to the state from the gas tax, motor vehicle registration fees, and federal aid would yield 321 millions in the 5-year period 1949 to 1954.¹⁶ Deducting from this sum approximately 215 millions for debt service, state police, state aid, and maintenance of the highway system, a 5-year total of some 106 millions would be left for construction. Because this sum would fall far short of urgent requirements, it was proposed that additional money be obtained through a 1-cent increase in the gas tax, from 3 cents to 4 cents, and from bond issues totaling 280 million dollars over a 10-year period.¹⁷

The proposal that the highway requirements of New Jersey be met through a general bond issue, serviced in part by gasoline taxes, met with considerable opposition from highway user groups. One position taken was that no increase in the 3-cent gasoline tax should be permitted in view of the fact that New Jersey had diverted highway user revenues to nonhighway purposes. In addition, the decision of the electorate to oppose bond issues for education and for a New Jersey Port Authority suggested that support for a highway bond issue could not be expected.

Opposition to the tax increase and lack of enthusiasm in the legislature for new bond issues led to interest on the part of the governor of New Jersey in the possibilities of toll-secured revenue bonds. The original plan to issue highway bonds was withdrawn, and the gover-

¹⁶ Federal aid assumed at 3 millions per year.

¹⁷ O. Herbert Fritzsche, *Projects Based on Bond Issue and Net Normal Income*, New Jersey State Highway Department, Revised May 10, 1948. A later estimate was prepared for the governor, listing projects which could be completed in six years with a 150-million dollar bond issue plus normal revenues.

nor requested the highway commission to draft legislation providing for toll financing. The widespread support for this alternative was due in part to the need for proceeding rapidly with highway improvements and in part to the consciousness of New Jersey residents that large volumes of interstate traffic use the highways of that state, and that their contributions in gas tax revenues are insufficient to meet the extraordinary cost of providing the facilities required to accommodate peak load traffic. The general attitude toward toll roads and the basis for public support for this program in New Jersey is expressed in a newspaper editorial citing the Governor's confidence that users would pay a reasonable toll for the economy and safety of a modern road. "When we look around at the Port of New York Authority bridges, and tunnels and luxury roads of neighbor states that pay off so handsomely, there is substantial basis for such confidence."¹⁸

FACTORS IN OHIO

The situation leading to the decision of Ohio to finance highways through tolls was described in testimony before a Congressional Committee:

Ohio does not have the money to build the highways she needs. The Federal-aid program today has allocated to the State of Ohio \$60,000,000 over a period of 3 years. . . .

This money currently is being used in various approved projects accomplishing 1 to 10 miles of highway. These, in most part, are sections of existing State highways. We are not providing, gentlemen, additional facilities which are vitally needed. Our transportation problem in Ohio is critical. The same is true throughout the Nation. Our property

¹⁸ Editorial from the *Newark Evening News*, quoted in *Automotive News*, July 19, 1948, p. 32.

damage and our loss in human life on the highway simply because of antiquated construction and design is something that we should consider seriously.¹⁹

Over three quarters of a billion dollars of new construction has been estimated as necessary on the limited mileage of expressways making up the interstate highway system in Ohio.²⁰ Many millions more would be required for principal highways not on the interstate system. Construction money available to the State Highway Department, however, was far from adequate to meet such needs; 31 million dollars from state sources in 1948 and 17 millions in federal funds. Additional highway funds from local sources would contribute very little to narrowing the gap between revenue and construction needs. The possibility of compensating for this difference, or of accomplishing needed construction at a more rapid rate, would call for substantial borrowing rather than full dependence on increased current revenues. One obstacle to such a program is that the state debt limit for all purposes is \$750,000, and it cannot be altered without amending the constitution.²¹ Moreover, there are other demands on the borrowing power afforded.

The magnitude of highway construction requirements in Ohio led to the proposal for a toll highway across the state, providing a connection with the westward extension of the Pennsylvania Turnpike.²² This was one of five superhighways aggregating 1,000 miles which were

¹⁹ Statement of Hon. Ralph A. Winter, Ohio State Senator, *Roads and Bridge Legislation*, Hearings before the Subcommittee on Roads of the House Committee on Public Works, 80 Cong. 2 sess., p. 110.

²⁰ *Highway Needs of the National Defense*, H. Doc. 249, 81 Cong. 1 sess. (1949), p. 55.

²¹ Ohio State Constitution, Art. 8, Pt. 1.

²² *Engineering News Record*, Sept. 19, 1946, p. 70.

suggested in 1946 by the Ohio Turnpike Committee.²³ Toll-road legislation introduced in 1947 to carry out this program failed to pass, but a new bill in 1949 was successful. In appointing the Turnpike Commission, the Governor made the statement that it had been "practically impossible for Ohio to keep up with road-building out of present revenues."²⁴

THE PROBLEM IN COLORADO

In Colorado, one of the few western states which has considered toll financing, the plan to construct a toll facility from Boulder to Denver grew out of financial difficulties similar to those of other states. The extensive requirements for accommodating traffic in a period of high costs and low unit receipts from user taxes could not be met with available revenues. However, other factors involving the Colorado tax system and expenditure program contributed to the favorable consideration of toll finance.

According to a 1945 report construction expenditures of at least 150 million dollars over a ten-year period would have been required to provide Colorado with the highway facilities necessary to accommodate anticipated traffic.²⁵ This report was prepared at a time when tax revenues were low because of wartime restrictions. Since then, not only has traffic volume risen to new levels, but the gasoline tax has been increased from 4 to 6 cents a gallon. At the same time, however, the sharp rise in highway construction costs has largely offset the improved revenue position.

²³ *Public Works News*, Nov. 21, 1946.

²⁴ *Automotive News*, Sept. 19, 1949.

²⁵ *A Report of Colorado's Highway Needs and Highway Finance*, prepared by W. M. Williams, Colorado State Highway Department, Oct. 30, 1945.

The Colorado study also showed that debt service and maintenance were absorbing the major part of state revenues available to the Highway Department. Annual payments of about \$1,975,000 were necessary to retire 25 million dollars of highway anticipation warrants. This debt service, continuing to 1954, constituted the share of the Highway Department in motor vehicle tax receipts. In addition to this requirement, state outlays for maintenance and operation had involved an average cost of 3.8 million dollars during the 6 years prior to 1945. Out of 6.2 million dollars of available state funds, therefore, the Department was spending about 5.8 millions for debt retirement, maintenance, and administration. Although little remained of state collected revenues to finance needed reconstruction of the system, federal funds for the first three postwar years provided 7.7 million dollars annually, and the required 6 million dollars of state matching funds were obtained from the postwar increase in user tax receipts. The fact that 7,638 miles of highways in Colorado are eligible for federal aid, however, indicates the impracticability of concentrating over 15 million dollars on only 34 miles of the system from Denver to Boulder.

According to the Department report, Colorado's highway problem has also been aggravated by a defective revenue system and by improper distribution of available revenue. First, potential revenue has been lost by inefficient administration of tax refunds. From 1933 through 1948 tax refunds for gasoline used on farms were 15 to 20 per cent of gross collections. An indication of the looseness of the Colorado administration of refunding is the fact that in 1944 Colorado's refunds to agriculture, with a 4-cent tax were \$1,056,600, whereas

in Nebraska, which is engaged in far more agricultural activity than Colorado, refunds to agriculture with a 5-cent tax totaled only \$400,000. Presumably illegal refunds were being made on a large scale.

The second loss of potential revenue resulted from a tax schedule that failed to compensate the state for costs incurred in providing highways adequate for heavy trucks. Manufacturer's rated capacity is the basis of truck taxation in Colorado despite the fact that this base has been abandoned in most other states because the loads actually carried by trucks bear little relationship to rated capacity. For example, it was found in Colorado that thousands of trucks carrying gross loads ranging from 12,000 to 30,000 pounds were paying identical license fees. Moreover, it appears that the ton-mile tax on for-hire trucking operations was poorly administered. This levy of two mills per ton-mile produced revenues of \$1,085,000 compared with \$2,044,000 collected in Oregon from a levy of one mill per ton-mile. Although the two states are similar in area, terrain, and truck registrations, Oregon collected almost twice as much revenue with a tax rate half that of Colorado.

The problem of financing Colorado's main roads has also been complicated by the method used to distribute available motor vehicle revenues among government units. For example, a part of state-collected gasoline tax revenues is allocated among the 63 counties in proportion to the state highway mileage located in each county. Serious inequities result from this formula because of the peculiar system under which responsibility for support of the state highway system is divided between state and local units. Under the system in effect the state highway department is exclusively responsible

for maintaining and constructing the federal-aid primary system while the counties are responsible for maintaining the federal-aid secondary mileage and other state roads located within their jurisdiction. In some counties a large portion of state highway mileage is contained in the federal-aid primary system while others have little or no mileage of federal-aid primary highways. Under this arrangement, then, the percentage of state-collected tax revenues allocated to the counties may bear little relation to either the individual or collective responsibility of these counties for maintaining state roads. A more equitable basis for allocating these funds would take into account the number of vehicle registrations, county area, and the mileage of highways actually maintained.

In summary, it is clear that Colorado's financial condition would be measurably improved by revision of current financial policy. Distribution of highway revenues on the basis of highway needs, effective policing of refunds, and a more realistic schedule and enforcement of truck taxation would all result in higher tax yields and their more productive application. However, policy reforms which would improve the Colorado situation in the long run offered no immediate solution to the problem of financing the Boulder-Denver road.

SUMMARY

The basic condition underlying resort to toll financing has been the widening gap between available revenues and the cost of bringing highway facilities to adequate standards. To the extent that highway construction estimates reflect actual needs, little can be done to change this side of the equation. Consequently, primary con-

cern must be directed to the question of why revenues are not being made available in sufficient amounts to meet requirements. Among the reasons are such secondary factors as inefficient highway administration and uneconomic distribution of the revenues available. These defects in public policy must be corrected if satisfactory management of the highway system is to be realized. But policy reform along these lines would not remove the difficulties standing in the way of an immediate reconstruction program. The basic factor underlying the toll-road movement is the inability to obtain the extraordinary financial support currently required for specific high-cost projects.

The revenues necessary to finance highway modernization may be obtained either through increasing current tax rates or by borrowing. It has been noted that tax increases have lagged behind the rise in prices, and that user groups have exerted considerable pressure to hold taxes to a minimum. Although a number of states have raised gasoline tax rates and adjusted schedules for other user charges, political formulas for distributing the proceeds have been retained. Aggregate revenues have been increased, but in general no provision has been made for concentrating expenditure on the limited mileage of highways where the need for modernization bulks largest. Again, even though eventual correction of this situation were in prospect, the magnitude and nature of highway needs would cast doubt on the propriety of the so-called "pay-as-you-go" system. Why should present highway users be required to supply the full amount necessary to finance a modernization program which is planned to serve the traffic needs of 30 years or more?

The ultimate question, therefore, is whether bonds can be issued to make possible immediate capital outlays on specific highways. We have seen that in some states constitutional amendments prohibit borrowing for highways, and that difficult obstacles frequently stand in the way of removing such constitutional prohibitions. But even if the traditional pay-as-you-go philosophy could be supplanted by bonding programs, there is no assurance that the proceeds could be applied to specific highways and in particular geographic areas in accordance with traffic priorities. Concerted opposition would arise from the same political forces that have produced unsound legislative formulas for the allocation of current revenues.

Two factors, then, underlie the toll-road movement: the high cost and urgency of the highway improvement program and the resistance to policy reforms essential for meeting the challenge through traditional financing methods. Since the decision to solve the problem through toll finance has been made in a number of states and is contemplated in others, it is important to weigh the merits and demerits of this alternative, and especially to determine the long-range implications of toll highway finance in relation to the immediate benefits sought by this expedient. As a basis for such evaluation, the next two chapters consider the following questions: (1) Does the toll road provide an acceptable method of programming and financing highway administration? (2) What are the long-run prospects of operating toll roads as self-sustaining enterprises?

CHAPTER IV

ADVANTAGES AND DISADVANTAGES OF TOLL ROADS

In the foregoing discussion of toll-road operations and factors underlying the toll-road movement, a number of considerations favoring this method of financing have been observed. In general it can be agreed that this device made it possible to obtain funds for timely construction of certain high-cost and high-priority facilities despite legal and financial obstacles which have resulted in piecemeal construction and lengthy delays. Consequently, the toll-road solution has proved attractive since it permits immediate realization of benefits in the form of lower vehicle operating costs and increased safety and comfort. In addition to these advantages based on expediency, the toll road has the merit of charging the direct users for the service provided.

It has been apparent, too, judging from experience to date, that substantial numbers of motor vehicle users are willing to pay an extra charge for the superior service offered by the toll road. Recently the 50 millionth motorist passed through the Merritt Parkway toll stations, and traffic data for both the Pennsylvania and Maine Turnpikes leave little doubt that public reaction has been favorable. The motorist who drives from Washington, D.C. to Portland, Maine, for example, finds that among the most adequate sections on the entire route are the toll-charging Merritt Parkway, New Hampshire Turnpike, and the Maine Turnpike. And the motorist who has traveled across Pennsylvania both on the Turn-

pike and on Route 30 is not likely to be impressed by the contention that the toll road is an undesirable development.

One automotive journal observes editorially, "Most motor vehicle users, we find, would prefer to have the highways we need *now*, rather than wait for some legislature in the dim future to finance these so-called 'luxury roads' out of current collections."¹

The Keystone Automobile Club, which has been a consistent supporter of the Pennsylvania Turnpike, sets forth its viewpoint in a report by the organization's president in 1947:

Toll roads in this day and age are an anachronism, to be tolerated only on the ground that they can provide entirely new and gravely needed facilities in shorter time than the State could construct them with monies from the Motor Fund without throwing the remainder of the highway system out of balance.

To this, I should like to add, that the Club would infinitely prefer a free road on a new right-of-way, safeguarded by grade separations and other safety features, if this could be done without imposition of a new and burdensome gasoline tax or by taking from the Motor Fund money badly needed for the over-all program of State-wide benefit to the motoring public.²

One of the leading magazines in the engineering field recently announced a change in its policy toward toll roads, and suggested that a re-evaluation of toll highway finance be made by the Bureau of Public Roads:

This journal has always opposed toll roads, believing that there is usually ample gas-tax money collected to build them as free roads. Yet there are instances where the hard facts of politics or economics make an exception necessary. . . . Admirable as it may be to support an idealistic objec-

¹ *Automotive News*, Aug. 23, 1948.

² *Keystone Motorist*, April 1947, p. 2.

tive, it is not always realistic or constructive. Now would be a good time for the . . . [Bureau of Public Roads] which did such a magnificent job a decade ago in directing the Nation's thinking on a proper course with respect to toll roads, to re-examine the question. Now, as then, it may find locations where traffic, high costs, or special political situations, justify a toll facility. A new guide is needed.³

Despite the advantages of toll-secured revenue bonds as a means of financing the highway program, other considerations have led to considerable opposition. In some cases it has been held that bond houses are conspiring to promote toll-road construction regardless of damage to the public interest. According to one government official, there are many persons

. . . who seem to be inspired with the idea that by promoting toll roads a more rapid development or improvement of our highways can be accomplished than has been possible under prevailing conditions with the public revenues available for that purpose, but their motives are not so much to benefit the public welfare but rather to provide an outlet for the profitable employment of consulting engineering organizations and for the investment of capital that has accumulated in financial institutions.⁴

In reply to similar charges, a New York investment banker has told a congressional committee

. . . our job was not to promote toll roads, as has been maliciously stated by some newspapers, but we are interested in good clean finance of hospitals, and highways, and schools.

There should be no fight between toll roads and free roads; it is not necessary. There has been a scrap going on for a long time. There is no use making misstatements, one

³ *Engineering-News Record*, Feb. 5, 1948, p. 60.

⁴ Letter from Philip B. Fleming, Administrator, Federal Works Agency, *Roads and Bridge Legislation*, Hearings before the Subcommittee on Roads of the House Committee on Public Works, 80 Cong., 2 sess. (1948), p. 131.

about the other. I am for both. Free roads supplement toll roads and toll roads supplement free roads.⁵

It was pointed out in this testimony that revenue bond financing of facilities for water, gas, and electricity totaled 1.5 billion dollars, and that this type of financing was being used very successfully as an adjunct to general financing by states and municipalities.⁶

Most opposition to toll-road finance, however, is based on four major objections:

1. Since toll roads cannot accommodate short-haul traffic, alternate free roads must be maintained—thus involving duplication of investment.
2. The presence of the toll road tends to discourage proper maintenance of the parallel free road.
3. The use of revenue bonds increases the cost of highway financing.
4. The cost of constructing and operating toll-collecting facilities is excessive.

DUPLICATION OF INVESTMENT

Toll roads necessarily eliminate much short-haul traffic and traffic which does not care to pay the toll. Thus other facilities must be maintained to serve this traffic. Opposition to toll roads is based in part on the contention that one modern road should be provided for all traffic, and that the provision of both a free road and a toll road means wasteful duplication of investment. The exclusion of short-haul traffic, however, is not a characteristic peculiar to the toll facility, but of the limited access road, whether a free road or a toll road. On many routes traffic volume is so heavy that separa-

⁵ Statement of J. C. Tripp, the same, p. 112.

⁶ The same, p. 117.

tion of through-traffic from local traffic may be desirable. Obviously, where a road of modern design could accommodate all traffic on the route, it would be an economic waste to supply parallel facilities. But the construction of a modern road designed to freeway standards almost invariably requires extensive re-location.⁷ Consequently, the old road must be maintained to provide access to previously developed land, dwellings, and business establishments. On the other hand it is apparent that where an existing road can be improved to satisfactory standards without moving to a new location, and without complete access control, the provision of a parallel road involves duplication of facilities. Whether this constitutes a wasteful duplication of investment is another question. Present or potential traffic volume may require the capacity provided by both roads.

In the case of a toll road, however, points of access may be still fewer than on a limited access free road due to the cost of toll-collecting facilities. Thus one of the objections raised against the Maine Turnpike is that interchanges were provided only where the prospective revenue was at least \$25,000 annually over a period of 23 years and that this resulted in locating interchanges an average distance of 12 miles apart.⁸ Thus ". . . the economic impracticability of providing for toll collections at frequent points of interchange

⁷This is true because of the excessive cost of land-taking for widening and realignment. For example, on U. S. Route 99 in Washington in 1948, the cost of acquiring land on one side of the road on a 27-mile stretch was estimated at 16 million dollars. By moving to a new location, the estimated cost of right of way, plus construction of a 6-lane road, was 13 millions.

⁸Joseph Barnett, "Why Toll Roads?" *Traffic Engineering*, October 1947, p. 11.

condemns toll highways as a means of relieving traffic congestion. . . .⁹ Yet it is obvious that congestion on a free road is substantially relieved by shifting through-traffic to the toll road. Traffic on U. S. Route 1 in Maine during August 1947 reached a congested daily volume of 8,215 vehicles, while traffic on the Turnpike exceeded 4,000 vehicles. If the Turnpike had not been available, traffic in excess of 12,000 vehicles a day might have attempted to use Route 1. It might well be argued that the toll road goes farther in denying short-haul use than does a free limited access road. But if funds are not available to provide the free road, criticism of the toll road which provides a partial solution seems irrelevant.

In summary, any new limited access road involves "duplication" of facilities to the extent that it parallels other highways, whether it is a free road or a toll road. A new highway with controlled access generally cannot be built on an old right of way, either because the cost would be prohibitive or because the state must continue to provide access to property on the old road. Such duplication of investment is not uneconomic, however, where traffic volume warrants the new facility.

NEGLECT OF ALTERNATE FREE ROADS

Another objection raised against the toll road is the possibility that competing highways will not be maintained or improved to standards which might create competition with the toll facility.¹⁰ This contention is

⁹ The same.

¹⁰ For example, it has been asserted that the construction of a toll road ". . . tends to put off the day when the parallel free roads are brought up to adequate standards of safety and capacity. . . ." *Engineering News-Record*, Mar. 30, 1950, p. 26.

based on the assumption that since both the toll authority and the state highway department are instrumentalities of the state, the highway department would not place the toll facility in financial jeopardy by providing a parallel free road of equal standards. If the service differential between the two roads were eliminated, there would be no inducement for the motorist to pay a premium for use of the toll road. Such a view was recently presented by a federal highway official to a Congressional Committee: ". . . no citizens who may look with sympathy upon the effort to reinstate a system of toll highways need be so naive as to think that once tolls on our highways are re-established those who own or control them will tolerate the competition of a system of free roads maintained at public expense."¹¹

From a short-run viewpoint, the possibility that a parallel free road could in fact be improved to standards competing with a toll road is only theoretical. Therefore, the contention that public officials would not tolerate such improvement is extraneous. The financial inability to improve the free road to adequate standards is the reason underlying the existence of the toll road. With respect to maintenance, however, there might conceivably be an attempt to reduce maintenance standards on the free road to provide further inducement to use the toll road. The probability that a state might take such steps would be guarded against in part by a responsible highway department and other state officials, as well as by pressure from organized user groups. But a more important fact is that in locations where it is necessary to resort to toll financing, it would be difficult to affect the service differential

¹¹ *Roads and Bridge Legislation*, Hearings, p. 131.

between the toll road and the free road to any considerable extent simply by varying maintenance.

The situation with respect to maintenance of Route 1 in Maine furnishes evidence of what has occurred to date in that particular instance. Observation of U. S. Route 1 indicates that, within the limits of the highway department budget, substantial improvement has been accomplished since the Maine Turnpike was built, including widening and resurfacing. Some Maine officials were of the opinion that winter maintenance had improved on Route 1 by reason of the competition between highway department and toll-road maintenance crews.

In the short period of experience with toll-road and free-road competition, no facts have been developed to support the contention that needed improvements or maintenance on the free road would be neglected in deference to the financial position of the toll road. Rather, the evidence available points in the other direction. There is, however, the further question of what prospects there might be in the long run of having the state build a parallel free road of standards comparable or superior to those of the toll road. Would a state which already has two parallel roads—the free road and the toll road—supplement these facilities by building a third and competing road? If a state has been unable to borrow or concentrate its program in such a way as to provide an adequate new road except through tolls, the question of whether or not to build a third road probably would not arise. If the opportunity to do so were presented, however, the state would presumably refuse as long as the toll road was properly located and designed to provide the service demanded. From an economic standpoint such refusal would certainly be the only sensible course. But the funds available for a third

road could be used to help pay off the debt on the existing toll road, thus bringing about an earlier realization of the desired free road. The holders of toll-road bonds would simply have advanced the funds necessary to permit earlier construction of the needed facility.¹²

The fact that the toll road "earns" large amounts of highway user tax revenues but receives none in return adds to the equity and reasonableness of this solution. It appears therefore that natural reluctance of a state to build a new modern free road duplicating an existing toll facility does not constitute a persuasive argument against toll financing.

THE COST OF FINANCING

The third major objection to toll roads is that revenue bond financing increases the cost of capital. In a given state, revenue bonds secured by tolls carry substantially higher interest rates than those backed by the full faith and credit of the state. The interest rate on bonds of the New Jersey Turnpike, for example, is 3.75 per cent, which compares with a rate of 2.125 per cent for New Jersey general obligation bonds issued in recent months.¹³ In addition to higher interest rates, revenue

¹² This alternative emphasizes the importance of adequate provisions in toll-road legislation as to design and location requirements and provisions governing calling and refunding of bonds. These factors are discussed in Chap. 5.

¹³ General obligation bonds issued for highways carry widely varying rates of interest, and meaningful comparisons with revenue bond rates must be confined to the state in question. Low rates on general obligations in 1948 were 1.5 per cent in Delaware, and in West Virginia 1.5 and 1.75 per cent. In North Dakota a general issue was sold to banks at interest rates varying from 1 to 1.5 per cent; and South Carolina issues were marketed at 1.75 and 2.1 per cent. General obligations in Montana were marketed at 1.9 and 2 per cent. Elsewhere rates on general obligations were substantially higher: from 2.25 to 2.5 per cent in New Mexico, and 2.5 to 3.75 per cent in Mississippi.

bonds generally sell at a substantial discount. In the case of the Maine Turnpike, there were two issues: \$15,000,000 at 2.5 per cent, and \$5,600,000 at 2.75 per cent. Bond discounts and expenses of financing were \$848,000 so that when this sum is added to annual interest charges, the effective rate of interest for the project is 2.7 per cent.

The original Pennsylvania Turnpike securities taken by the RFC were 3.75 per cent bonds sold at a discount to yield 4 per cent. In the latter part of 1946, after several years of operating experience, the Commission was able to refund the original issue at 2.5 per cent. A later refunding in 1947 was accomplished with 47 million dollars of serial bonds bearing interest at 2.25 per cent, while 87 million dollars of 40-year term bonds were sold for the Philadelphia extension at 3.25 per cent. Finally, in 1949 an issue of 77.5 million dollars was sold to finance the western extension, and these bonds sold to yield 2.9 per cent interest.

While there are means of circumventing the high cost of borrowing, there are potential dangers in diluting the rigid tests connected with revenue bond financing. If the general credit of the state is pledged, certain safety margins that would otherwise be applied in determining economic feasibility are eliminated, and the necessity for strict economic accounting is lessened. In other fields such arrangements have bred unsound projects and involved governments in financial crises.¹⁴

By making the revenue bonds a guarantee of the state the necessity for an extra margin of safety is eliminated and a saving in interest can be achieved. This considera-

¹⁴ For a history of state experience with toll-financing of canals during the nineteenth century, see Harold G. Moulton and Associates, *The American Transportation Problem* (1933), pp. 429-33.

tion has led to a proposal in New York State to combine self-liquidating facilities with general credit finance. On an issue of 450 million dollars for the proposed New York Thruway, the saving on general obligation bonds as compared to revenue bonds would amount to 5.6 million dollars in the first year. Total savings over the life of the bonds would exceed 100 million dollars. Additional savings could be realized from the ability of the authority to borrow funds as needed rather than to sell the entire issue at one time. Since three years would be required to construct the Thruway, savings in interest during construction would be 15 to 25 million dollars.¹⁵ While such an arrangement may be acceptable in a specific situation, it is illustrative of the factors which may lead to sacrifice of the self-liquidating principle in toll-road undertakings.

A method of avoiding the high charges involved in revenue bond financing without utilizing the general credit of the state has been worked out by the New Jersey Turnpike Authority. The plan calls for the sale of turnpike bonds to a group of some 50 institutional investors on a "forward commitment basis," enabling the Authority to issue bonds as needed, but to obtain commitments for further issues at a standby fee of 0.5 per cent on the balance of the Authority's total requirements. This plan involves 220 million dollars, compared to 242 millions which would have been required if resort had been made to a public issue. If contingencies which have been provided for do not materialize, the bond issue may be reduced to 202 million dollars. A saving of from 18 to 40 million dollars may be accomplished

¹⁵ Report of the Governor's Thruway Committee, New York, Mar. 4, 1950. The Committee recommended a constitutional amendment to permit the state to lend its credit to the Thruway Authority.

on the amount of borrowing, as well as substantial savings in interest charges during construction. According to the New Jersey Turnpike Authority:

. . . The Commissioners are confident that this plan provides the best financing terms available for a project of this type and magnitude and that it establishes a new means of achieving large scale construction for the public benefit through the use of private capital which may well set a pattern for comparable future undertakings in New Jersey and in other states.¹⁶

New Hampshire resorted to general obligation bonds to be paid off through toll charges after the engineering and traffic surveys indicated that the New Hampshire Turnpike would be self-supporting by a wide margin. It was decided that since there was little danger that the State would be called upon to meet a deficit, advantage should be taken of the credit of the state to obtain a lower rate of interest.

Despite the fact that there are means of getting around the high cost of revenue bond financing, these very means often require that there be a relaxation of the rigid tests of self-support which are an essential part of the technique of toll financing. Where such means are adopted, the facility is not purely a toll-financed project but involves rather a mere use of the toll gate backed by other financing methods. The contention that the cost of revenue bond financing is high remains an undeniable disadvantage inherent in this method of providing highway facilities.

COST OF COLLECTION FACILITIES

Even though all other elements of cost could be equal-

¹⁶ New Jersey Turnpike Authority, *First Annual Report* (1949), p. 20.

ized, it is maintained that the cost of a toll road would exceed that of a comparable free road because of certain physical features and administrative expenses resulting from the requirements of toll-collecting facilities.

Special physical characteristics of the highway are generally required to make toll financing possible. For example, a toll highway must generally have all cross streets separated at grade to prevent entrance and exit at points not provided with toll-collecting facilities. On the other hand, many limited-access free roads are designed to permit some unimportant roads to cross at grade to avoid the high cost of grade separations. A second physical feature peculiar to the toll road is that all turning movements at interchanges must be brought to 1 or at the most 2 points for purposes of toll collection. Construction of these intricate interchange facilities and the necessary structures for the efficient collection of tolls involves substantial outlays.¹⁷

It is difficult to measure the precise difference between the cost of adapting a modern highway to toll finance and that incurred in providing a limited-access free road. For example, savings resulting from failure to provide complete segregation of crossing traffic must be weighed against the accident hazards involved in that type of design. But these added hazards cannot be

¹⁷ Joseph Barnett, "Why Toll Roads," *Traffic Engineering*, October 1947, p. 13.

Another authority states that: "Under proper administration and design, costs of toll highways and free highways should be identical, except for the nominal cost of toll collection devices. Crossing or conflicting lines of traffic must be avoided for safety purposes and points of access and departure must be controlled and strategically located, with adequate grade separation facilities. Interchanges on toll roads are merely part of these facilities." From letter to the editor from E. R. Needles, Consulting Engineer, in *Engineering News-Record*, June 26, 1947, p. 951.

accurately evaluated in money terms. Moreover, the added cost of bringing turning movements to toll-collecting points cannot be definitely segregated from total outlays.¹⁸ However, it is possible to determine the administrative cost of operating toll gates.

Economy and ease of collection are the two chief advantages of collecting road "tolls" in the form of registration fees and gasoline taxes rather than in cash at toll gates. In 1948, 2.1 billion dollars were obtained from motor vehicle owners and operators through highway user taxes at a collection cost of 84 million dollars, only 4 per cent of total receipts.¹⁹ This low rate of administrative expense is the product of large volume and the fact that filling station operators actually serve as toll collectors without direct cost to the state. It is generally assumed that the cost of collecting cash tolls would greatly exceed the nominal rate for administering the conventional highway revenue system, and this is frequently cited as an unfavorable aspect of toll finance.

It is obvious that the administrative costs of raising revenues for a combined free-road and toll-road program would be greater than if an equal amount of revenue were raised by conventional methods. The basic organization for collecting gasoline taxes and license fees is already in operation, and additional revenue can be secured merely by adjusting the rates of these charges without any appreciable increase in administrative expense. Consequently, it must be acknowledged at the

¹⁸ It appears that one of the special physical features of toll roads, namely, the collection facilities, involves only minor additional outlays. For example, the cost of constructing toll houses on the Maine Turnpike amounted to only 262 thousand dollars, or 1.3 per cent of the cost of the highway.

¹⁹ U. S. Bureau of Public Roads, Table DF, 1948, issued August 1949.

outset that any development of toll roads adds to the cost of highway revenue collection.

Experience to date, however, indicates that the cost of collecting tolls on a soundly conceived facility will not necessarily be excessive. Such costs will naturally vary from one project to another in accordance with density and composition of traffic, and the extent to which the turnpike authorities attempt to accommodate unprofitable local traffic as a public service. Moreover, it is apparent that over the life span of any single project collection costs as a percentage of total revenues will tend to follow the familiar pattern of any new large-scale facility involving high initial capital outlays. In all such understandings, characterized by a high proportion of fixed charges to total operating expense, unit costs, especially those of an administrative character, tend to decline with expanding volume.

The effect of these variables on the cost of collecting tolls is reflected in the experience of toll roads now in operation. The Maine Turnpike illustrates the cost of revenue collection associated with a new undertaking in the early stages of traffic development and the effects of an unfavorable traffic pattern. (See the table on page 78.) During 1949 operation of the toll-collecting facilities cost \$102,000. This was more than twice the outlay for maintenance of the road and represented 45 per cent of all turnpike operating costs. These ratios have no long-term significance since maintenance costs on a new facility are nominal and inevitably increase with age. However, the collection cost amounted to 12 per cent of gross revenues. Although subject to eventual reduction by increased traffic volume, this percentage of revenue absorbed by the mere process of collection

is high and reflects what now appear to be inherently unfavorable factors.

The Maine Turnpike is subject to extreme seasonal variations in traffic volume. The expense of toll collection in 1949 ranged from 22 per cent of receipts in January to a fraction less than 6 per cent in July. This variation resulted from the fact that traffic in the summer months was more than three and one-half times the January volume, whereas collection costs are relatively

COSTS OF TOLL COLLECTION, MAINE AND
PENNSYLVANIA TURNPIKES, 1949^a

Item	Maine Turnpike ^b	Pennsylvania Turnpike ^c
Income		
Fare revenues.....	\$842,029	\$5,963,969
Concession revenues.....	24,830	361,535
Other.....	4,795	
	<hr/>	<hr/>
Total.....	\$871,654	\$6,325,404
	<hr/>	<hr/>
Operating expense		
Administration.....	\$ 41,313	\$ 254,434
Toll collection.....	102,175	224,387
Road patrol.....	2,369	99,265
Maintenance.....	47,749	741,183
Miscellaneous.....	35,243	14,853
	<hr/>	<hr/>
Total.....	\$228,849	\$1,334,122
	<hr/>	<hr/>
Costs of toll collection:		
As per cent of revenues.....	11.7	3.5
As per cent of maintenance.....	214.0	30.3
As per cent of total expense.....	44.6	16.8

^a Data from Maine Turnpike Authority and Pennsylvania Turnpike Commission.

^b Calendar year.

^c Fiscal year June 1, 1948 to May 31, 1949

fixed regardless of traffic volume.²⁰ These conditions result in collection costs on the Maine Turnpike averaging 12 per cent of collections for the year as a whole.

The second unfavorable factor in the Maine situation is found in the pattern of traffic as measured by length of trip, density of traffic, and relationship of passenger car to truck volume. The potential length of trip is of course limited by the relatively short length of the Maine Turnpike. In order to attract the largest possible portion of the traffic potential for the facility, it was found necessary to provide 6 interchanges, each served by a toll house, spaced at intervals ranging from 3.4 to 17.2 miles. Sixty per cent of the vehicles using the road represent through traffic, while the remaining 40 per cent use one or more of the intermediate interchanges. Average length of trip is 35 miles. By comparison the original 160-mile Pennsylvania Turnpike has only 11 toll collecting facilities at intervals ranging from 8.5 miles to as much as 35.6 miles and the average trip length is 100 miles. (See table, page 80.)

The fact that Pennsylvania Turnpike toll-collection costs amounted to only 3.5 per cent of receipts, compared to 12 per cent in Maine, is explained in part by these longer trips and in part by the volume and character of the traffic.²¹ The 11 toll houses on the Pennsylvania road served 3,844,000 vehicles in 1949, compared to the 1,684,000 vehicles passing through the 6 toll gates on the Maine pike. But whereas Pennsylvania Turnpike traffic was only 2.3 times greater, it produced more than 7 times as much revenue. This differential in revenue for

²⁰ See table on p. 93.

²¹ The cost of operating each toll house was considerably lower on the Maine Turnpike than the Pennsylvania: \$14,571 per year compared to \$20,400.

TOLL ROADS

TRAFFIC INTERCHANGES AND MILEAGE INTERVALS,
MAINE AND PENNSYLVANIA TURNPIKES

Maine Turnpike Interchanges ^a	Dis- tance	Pennsylvania Turnpike Interchanges ^b	Dis- tance
Kittery.....	0	Irwin Interchange.....	0
Kittery (Toll House).....	0.36	New Stanton Interchange.....	8.5
Wells Interchange.....	17.58	Donegal Interchange.....	23.7
Kennebunk Interchange.....	23.81	Somerset Interchange.....	42.9
Biddeford Interchange.....	29.71	Bedford Interchange.....	78.5
Saco Interchange.....	33.06	Breezewood Interchange.....	95.9
Portland (Toll House) (Town of Scarboro).....	42.16	Fort Littleton Interchange.....	112.6
Junction (Portland).....	44.34	Willow Hill Interchange.....	121.6
		Blue Mountain Interchange.....	134.3
		Carlisle Interchange.....	157.5
		Middlesex Interchange.....	159.6

^a Information given in a letter from W. B. Getchell, Jr., Executive Director of the Maine Turnpike Authority, April 1950.

^b Information taken from a brochure, *Pennsylvania Turnpike*, July 1948. The 100-mile eastern extension of the Turnpike, opened in December 1950, has 8 interchanges. When the western extension is completed, there will be 24 interchanges on the 327-mile highway.

the two facilities results from the higher fares paid per vehicle on the Pennsylvania Turnpike, which in turn result from the longer length of trips and the much larger percentage of heavy trucks. The effect that commercial vehicle patronage has on average revenue per vehicle is indicated by the fact that trucks, constituting only 21 per cent of the vehicles using the Pennsylvania Turnpike, produced 60 per cent of the aggregate toll revenue. In sharp contrast, trucks produce only 14 per cent of the toll revenue on the Maine Turnpike. (See tables on pages 81 and 82.)

Although the factors just noted will tend to keep the cost of toll collection relatively high on the Maine Turnpike, experience in Pennsylvania indicates that the present rate will be reduced substantially with increased

volume and changing composition of traffic. Thus between 1941 and 1949 the cost of collecting tolls on the Pennsylvania Turnpike was reduced from slightly less than 10 per cent to 3.5 per cent of aggregate revenue.²²

TRAFFIC AND REVENUES BY TYPE OF VEHICLE, MAINE TURNPIKE
1949^a

Type	Number of Vehicles	Per Cent	Revenues	Per Cent
Passenger cars ^b	1,528,792	90.8	\$720,932	85.5
Trucks.....	151,052	9.0	117,078	13.9
Busses.....	3,859	.2	5,268	.6
Total.....	1,683,703	100.0	\$843,278	100.0

^a Data from Maine Turnpike Authority.

^b Includes approximately 2,000 motorcycles.

During this period the number of all types of vehicles using the turnpike increased 56 per cent, while the number of trucks increased 235 per cent.

The effect of these trends on revenue is even more marked. Tolls paid by truck operations increased from \$882,000 in 1940-41 to about 4 million dollars in 1949—almost a four-fold increase. The net result was that trucks paid 60 per cent of aggregate toll revenue in 1949 as against 32 per cent in 1940-41.

The extremely high cost of collecting tolls on certain roads in Connecticut has frequently been cited as evidence against this method of highway financing. The Merritt Parkway station at Greenwich collected \$717,000 in fiscal 1949 at a station cost of \$87,000, representing about 12 per cent of receipts. Costs at the Milford sta-

²² Tunnel and fare collection operations between June 1, 1941 and May 31, 1942 amounted to \$273,746 as compared with "net fare revenues" of \$2,877,730.

TOLL ROADS

PENNSYLVANIA TURNPIKE
TRAFFIC AND REVENUE BY TYPE OF VEHICLE^a
I. 1940-41

Vehicle Type	Number of Vehicles	Per cent of total	Revenue	Per cent of total
Passenger cars ^b	2,207,973	89.3	\$1,798,112	65.9
Trucks.....	245,576	9.9	882,107	32.3
Busses.....	20,268	.8	49,709	1.8
Total.....	2,473,817	100.0	\$2,729,928	100.0

II. 1949

Passenger cars ^c	2,984,971	77.6	2,497,905	37.9
Trucks.....	824,320	21.4	3,977,804	60.4
Busses.....	39,497	1.0	113,721	1.7
Total.....	3,848,788	100.0	\$6,589,430	100.0

^a Data from Pennsylvania Turnpike Commission.

^b Includes 3,275 motorcycles.

^c Includes 5,131 motorcycles.

tion, where the Wilbur Cross Parkway begins, absorbed 18 per cent of the revenues collected.²³

Three factors peculiar to the Connecticut Parkways result in high collection costs and warn against generalizing from that experience. One is the fact that the percentage of toll-collection costs to toll receipts would have been substantially greater had collection facilities been provided at all access points, as they would have to be if these roads were actually self-supporting facilities financed by toll-secured revenue bonds. Second, receipts would have been greater, and collection costs much smaller proportionately, had the toll been set at a figure designed to finance the entire cost of the parkways. And

²³ Data from Roy E. Jorgensen, Deputy Commissioner, Connecticut State Highway Department.

finally, trucks are excluded from these parkways, thereby sacrificing a major source of toll revenue.

FACTORS OFFSETTING EXTRA COST OF TOLL ROADS

There are two factors which help to compensate for the extra costs which may be incurred in the provision of toll facilities. The most important is the fact that toll financing expedites completion of a needed road, and permits early realization of the economies accruing from modern road design. Substantial money savings result from avoidance of accidents, reduction in travel time, and lower vehicle operating costs associated with uninterrupted vehicle movement. In addition, the fact that the toll road is protected from abutting land uses by strict control of access means that the investment in such facilities will be properly safeguarded against the rapid obsolescence which has meant loss of investment on so many costly main highways not so protected.

It is true that safety and operating economies are functions of road design rather than of finance. Consequently, from an engineering standpoint, these economies may be realized as readily through the provision of a modern free road as through the provision of a toll facility. This, however, is of only academic interest to the highway user if, for the variety of reasons already cited, it is not feasible to obtain these economies promptly through conventional means of financing.

A second consideration to be weighed against the extra costs of toll-road administration and financing is the revenue potential from concessions operated on toll roads. In the highway field, the operation or rental of land and buildings for gasoline stations, restaurants,

hotels, and other facilities has to date been a toll-road innovation. Revenue from this source could of course be obtained in connection with any limited access highway, whether toll road or free road.

The importance of concession revenues as a supplement to direct user charges may grow to considerable proportions, since limited access design is becoming increasingly accepted as desirable on all main road mileage. The logic of developing these revenue sources, moreover, is clear. In the past, commercial operations conducted along the highway not only made no contribution to the highway fund, but to a major degree brought about the early obsolescence of the highway and the loss of substantial road investment. From the standpoint of equity and prudent investment, those taking advantage of public property by locating along the highway and conducting business there should not only be subject to regulation but also to a reasonable charge. In this way some of the benefits created by the public improvement can be recouped by those who pay the bill.

The use of concession revenues to help defray the cost of public improvements first became a lucrative practice in air transportation. For example, of the 1.9 million dollars in revenues realized at La Guardia Airport by the Port of New York Authority during 1949, 1.1 million was so-called nonflight revenue.²⁴

The opportunity for toll roads to realize substantial income from concessions is generally afforded by specific grant of authority in toll-road legislation. An example of the wording of toll legislation on this point is pro-

²⁴ They included income from newsstands and eating counters, restaurants, parking areas, taxi concessions, and gasoline stations serving automobiles.

vided by the West Virginia statute, which stipulates that the toll commission may

. . . contract with any person, partnership, association or corporation desiring the use of any part (of a turnpike project), including the right-of-way adjoining the paved portion, for placing thereon telephone, telegraph, electric light or power lines, gas stations, garages, stores, hotels, restaurants and advertising signs, or for any other purpose except for tracks for railroad or railway use. . . .²⁵

Experience on the Merritt Parkway as well as on the Pennsylvania and Maine Turnpikes indicates that, in the financing of highways, the revenues from concessions may constitute an important source of income. The Merritt Parkway obtains concession revenues from gasoline station rent, (\$500 per month per dual station) and royalties on gallonage sold. Revenue from these sources increased from \$4,700 in 1940 to \$271,200 in 1949. (See table on page 86.) The latter amount exceeded the \$225,049 expended for maintenance on the 37 miles of parkway. With the addition of another set of stations in 1950, this revenue of \$7,250 per mile will be further augmented.

The Maine Turnpike has one set of filling stations and one restaurant in its 44-mile length. During the first full year of operation, receipts from these concessions were \$24,830. Although these revenues amounted to only slightly more than 10 per cent of the cost of administering and maintaining the road, they were sufficient, for example, to cover almost one fourth of the expense of toll collection. (See table on page 78.)

Concession revenues on the Pennsylvania Turnpike have been of much greater magnitude. On the original

²⁵ H.B. 428, West Virginia (1947).

160-mile section ten service stations are operated by the Standard Oil Company of Pennsylvania. Restaurant counter service is provided at these stations. Dining rooms and lunch bars are provided at the Midway Station, as well as a recreation room and sleeping accommodations for truck drivers. Concession revenues in the

CONCESSION REVENUES, MERRITT PARKWAY^a

Fiscal Year	Dual Stations in use	Royalty per Gallon (in cents)	Receipts
1940.....	1	3.39	\$ 4,700
1941.....	1	3.39	46,600
1942.....	2	3.39 and 3.562	75,300
1943.....	3	3.86, 3.562, and 3.73	42,500
1944.....	3	3.86, 3.562, and 3.73	45,500
1945.....	3	2.89, 1.94, and 1.87	41,400
1946.....	3	2.89, 1.94, and 1.87	100,700
1947.....	3	4.76 all stations	252,700
1948.....	3	4.76	245,200
1949.....	3	4.76	271,200

^a Information from Roy E. Jorgensen, Deputy Commissioner and Chief Engineer, State Highway Department of Connecticut.

fiscal year 1949 were \$361,535. This exceeded by a considerable margin the cost of toll collection (\$224,387) and amounted to about 27 per cent of the \$1,334,000 expended for all operating purposes (excluding interest and debt retirement). (See table on page 97.) When the entire 327 miles of the Turnpike are opened to traffic, the number of service stations and restaurants will be increased to 21.

SUMMARY

It would appear from the above analysis that many of the objections most commonly raised against toll-road development do not constitute determining factors in

evaluating the validity of this method of road provision. First, it has been shown that toll roads do not necessarily involve duplication of facilities and investment. Modern design and high density traffic require separation of grade and limitation of access and in most cases the construction of a new road on a new location. Consequently, duplication of investment, if any, is involved in the provision of a free road built to modern standards as much as to a toll road.

Second, there is no basis in experience to date to indicate that state highway authorities would neglect the maintenance or improvement of a free road merely because of the presence of a parallel toll road.

Third, the cost of financing is higher for a toll road but need not be excessive. Several states have already devised methods of obtaining capital through revenue bonds at interest rates more comparable to borrowing backed by the full faith and credit of the state.

Finally, the cost of toll collection is an added expense but can be kept within reasonable limits. It has been found that the cost of collecting tolls decreases with expanding use of the facility, especially where a large portion of traffic is represented by heavy-duty trucking operations. Moreover, experience on toll facilities now in operation indicates that substantial offsetting revenues can be obtained from use of the right-of-way for concessions.

The next chapter examines a further aspect of the toll-road problem: the outlook for toll roads as self-liquidating ventures, and the financial implications for the highway system as a whole which are said to arise from the financial uncertainties of toll-road undertakings.

CHAPTER V

FINANCIAL PROSPECTS OF TOLL ROADS

One of the principal reasons for rejection of the toll method of highway finance has been the belief that as a rule these roads cannot pay for themselves.

. . . Rather exhaustive studies made in many places indicate that, with possibly a few exceptions, it cannot reasonably be expected that traffic will bear the additional charges on toll facilities for a long enough period to amortize the investment, maintain the facilities, and carry the cost of operation of toll roads, which is in itself a considerable amount. In all probability, many of the groups sponsoring toll roads more or less recognize this condition and have in the back of their minds that within a short period of time they will request the legislatures of the various states to make these toll facilities free and that the states will take on the additional burden.¹

The toll road is subject to two primary obstacles to self-support. One of these is the presence of alternate free routes, which generally mean inferior service but which offer the motorist a choice. He may either use the free road and pay the extra gasoline and other operating costs associated with driving on inadequate highways, or he may elect to pay the extra charge in the form of a toll in order to realize savings in time and operating costs, or to enjoy the greater safety and comfort of the superior facility.²

¹ Letter to editor of *Contractors and Engineers Monthly* from R. H. Baldock, State Highway Engineer, Oregon State Highway Commission, October 1947, p. 4.

² The toll bridge enjoys security because it is generally in the monopolistic position of offering the only service to be had. At least the user would have to detour or perhaps ferry the crossing to avoid paying the bridge toll.

The terms of this choice, however, may vary considerably from time to time. Improvement of the free route, for example, may eventually cause traffic to leave the toll road, because the toll charge may no longer seem worth the smaller service premium offered. Future economic conditions, too, might result in less use of the toll facility, either because of declining congestion on the free road or because users might not be impressed by ultimate savings or non-monetary benefits accruing from the toll road compared to the cash saving possible on the free road.

A second and inherent limitation on the potential earning of a toll road lies in the fact that it must be designed primarily for relatively long-haul traffic. The preponderance of motor vehicle use, however, is for short trips. About one half of total mileage is operated in urban areas, and a substantial portion of the other half is accounted for by individual trips of less than 50 miles. Consequently, not all the traffic known to be moving over the general route to be served by a proposed turnpike can be considered as even potential business for the new facility. This controlling factor places severe limitations on the number of locations that afford a sufficient volume of patronage to support a self-liquidating project.

In considering the financial outlook for toll highways, attention will be directed to the experience thus far with the Pennsylvania, Maine, and New Hampshire Turnpikes. Financial estimates which have been made for contemplated projects will also be reviewed, and the experiences thus far encountered in the attempt to make necessary financing arrangements for these projects will be discussed.

THE MAINE TURNPIKE

The Maine Turnpike is the only toll highway which has been financed without government aid of any kind and therefore, constitutes an example of the possibility of self-liquidation. It was financed by a 15 million dollar bond issue at 2.5 per cent and a second issue of 5.6 millions at 2.75 per cent. The interest charge payable during the first year of operations was met from construction funds, since normal revenues could not be expected to be earned until the project was in full operation. First year operations bore out the wisdom of this move; although traffic was greater than expected, revenues were 18 per cent below expectations, and net revenue after operating expenses was not sufficient to meet interest charges.

Revenues during the first year were lower than estimated for several reasons, one being that a lower percentage of traffic was accounted for by trucks than was expected.³ Further, the first winter was an abnormally severe one, construction work continued on the road for 7 months of the year, and neither restaurant nor service stations were available on the route until December.

Total income for 1948⁴ was \$669,800 which, after deduction of \$220,500 for operating expenses, left a balance of \$449,300 for debt service, an amount insufficient to cover interest charges of \$512,500. During 1949 the trend in traffic turned upward and the number of vehicles using the turnpike was nearly 1.7 million, or 11 per cent higher than in 1948. In May 1949 the full

³ Of the 1,516,000 vehicles using the turnpike in 1948, only 120,000 were trucks. Passenger cars accounted for 86.7 per cent of fare revenues.

trip passenger car fare was raised from 50 to 60 cents, further increasing revenues. Earnings for 1949 were \$871,654 and operating costs amounted to \$228,849. This left a balance of \$642,805 for debt service. Appendix table, page 193, outlines a proposed program for meeting interest charges and for retiring the bonds. It will be seen that nearly double the 1950 interest charge of \$529,000 can be covered by total revenues at the 1950 level, which amounted to \$1,041,066. With the upward trend in revenues which can be reasonably anticipated, it should be possible to amortize the 20.6 million dollar bond issue at par by 1975.⁴ There is a further margin of safety in that by 1951 the Turnpike Authority had a net cash balance in reserves on hand in the amount of \$748,000.

Experience to date on the Maine Turnpike shows that both favorable and unfavorable factors govern the financial future of this highway. Among the favorable factors is the continuing increase in patronage. Although the Maine Turnpike is situated in an area where traffic during most of the year is light, it is important as a means of relieving summer-time congestion on Route 1 as indicated by the fact that 1.9 million vehicles made use of the toll facility during 1949.

⁴ It should be noted too that in addition to the amount of cash tolls collected, the Turnpike earns a considerable amount of tax revenue in the form of gasoline taxes, and that if this tax revenue were taken into account the financial position of the facility would be substantially improved. Recognition of this fact was contained in a bill, defeated in the Maine Legislature during 1949, designed to provide for the extension of the Maine Turnpike. On the assumption that 1 gallon of gasoline is consumed for every 15 miles of car operation, it was estimated that 3.6 million gallons of gasoline were consumed yearly on the turnpike producing \$216,000 of revenue. This money was to be made available to the Turnpike Commission to cover the cost of surveying the new routes.

TOLL ROADS**MAINE TURNPIKE, TRAFFIC AND REVENUE BY TYPE OF VEHICLE^a**
I. Traffic

Class of vehicle	Number of vehicles		<i>Per cent change 1948 to 1950</i>
	1948	1950	
Passenger cars ^b	1,393,122	1,740,537	24.9
Trucks by gross weight:			
Up to 7,000 pounds.....	39,307	44,918	14.3
7,001 to 16,000 pounds....	37,920	37,769	-0.4
16,001 to 32,000 pounds....	26,162	49,448	89.0
32,001 to 50,000 pounds....	16,474	59,121	258.9
Total.....	119,863	191,256	59.6
Busses up to 12 passenger.....	61	80	31.1
Busses, 13 passengers and over.....	3,125	4,573	46.3
Total vehicles.....	1,516,171	1,936,446	27.7

II. Revenue^a

Class of vehicle	Gross Toll		<i>Per cent change 1948 to 1950</i>
	1948	1950	
Passenger cars ^b	\$ 569,137	\$ 839,916	47.6
Trucks by gross weight:			
Up to 7,000 pounds.....	14,337	19,021	32.7
7,001 to 16,000 pounds ..	23,418	24,541	4.8
16,001 to 32,000 pounds....	21,030	42,038	99.9
32,001 to 50,000 pounds....	22,985	78,948	243.5
Total.....	81,765	164,548	101.2
Busses up to 12 passenger.....	58	74	27.6
Busses, 13 passengers and over.....	4,255	6,053	42.3
Total vehicles.....	\$ 655,215	\$1,010,591	54.2

^a Data from Maine Turnpike Authority.^b Includes approximately 2,000 motorcycles.

° The net fare revenue was \$2,180 less due to volume discounts. Other revenue, from concessions, totaling \$32,582, are not included in this table.

Particularly significant from a revenue standpoint is the increase in the volume of truck traffic using the Turnpike. Between 1948 and 1950 there was a 48 per cent increase in passenger car traffic but a 101 per cent increase in truck traffic. The largest traffic gains were registered by the heavier trucks. Thus the number of vehicles with gross weights of 32,000 to 50,000 pounds increased 259 per cent from 1948 to 1950 compared with 89 per cent for trucks in the 16,000 to 32,000 gross weight class. But the 1950 toll revenues paid by trucks on the Maine highway—amounting to \$164,548—were only 16 per cent of total fare revenue.

One obstacle to a sounder revenue position is the extremely seasonal nature of the traffic. In the summer peak months of July and August 1949 some three and a half times as many vehicles used the Turnpike as in January and February. (See table below.) The highway problem which the Maine Turnpike seeks to re-

SEASONALITY OF MAINE TURNPIKE TRAFFIC 1949*

Month	Number of vehicles	Index (January = 100)
January.....	71,431	100.0
February.....	73,376	102.7
March.....	87,176	122.0
April.....	112,722	157.8
May.....	145,053	203.1
June.....	147,511	206.5
July.....	259,745	363.6
August.....	249,650	349.5
September.....	185,118	259.2
October.....	140,279	196.4
November.....	120,976	169.4
December.....	90,666	126.9

* Data from Maine Turnpike Authority.

lieve is to a large degree the peak load problem on Route 1 in the summer months. Traffic in Maine is inherently seasonal due to the severity of the winter climate and to the importance of Maine as a summer resort. The Maine Turnpike suffers more from this factor than other highways because in the off-peak months the reduced traffic on Route 1 lessens the relative advantage of using the Turnpike to avoid congestion and delays.

THE PENNSYLVANIA TURNPIKE

The Pennsylvania Turnpike differs from the Maine Turnpike in that a grant of \$29,250,000 was made by the Public Works Administration to assist the Commission in constructing the original 160-mile section. At the same time, revenue bonds in the amount of \$40,800,000 were purchased by the Reconstruction Finance Corporation and later absorbed by private bankers. All additional construction has been financed through the issuance of revenue bonds without recourse to government assistance. The table on page 95 shows the course of revenue bond financing which has taken place. In 1946 it was possible to refund at 2.5 per cent outstanding issues being carried at 3.75 per cent. Again in 1948 it was possible to refund at a further reduction to 2.25 per cent. The salability of Turnpike Bonds was sufficient to allow a simultaneous offering of \$87,000,000 at 3.25 per cent. Finally, an issue to cover the construction of the western extension of the Turnpike was made in 1949 at only 2.9 per cent. The total amount of bond issues now outstanding is 211.5 million dollars.

The ability to carry and retire these issues is of course dependent upon traffic volume and toll receipts. When the Turnpike was first opened in 1940, traffic was con-

siderably heavier than originally estimated, with an average daily volume of 5,000 vehicles during the first 8 months of operation. During the next 6 months of vacation weather, this figure rose to 8,800 vehicles per day. For the fiscal year ending May 31, 1942, revenues

PENNSYLVANIA TURNPIKE REVENUE BOND FINANCING^a

Year	Purpose	Amount	Interest Rate
1938	Original 160-mile construction.....	\$ 40,800,000	3.75
1943 ^b	Completion of original construction...	1,500,000	3.75
1946	Refunding of outstanding bonds.....	\$ 42,300,000	
	Bonds authorized but not issued ^b	1,500,000	
	Redemption premium on 1938 issue...	1,692,000	
	Interest payable.....	508,000	
1948	Total refunding issue.....	\$ 46,000,000	2.50
	Redemption premium on 1946 issue...	1,000,000	
	Total refunding issue.....	\$ 47,000,000	2.25
1949	Construction of Philadelphia extension	87,000,000	3.25
	Construction of western extension....	77,500,000	2.90
1950	Total bonds outstanding.....	\$211,500,000	

^a Data taken from an address by G. B. Gilbert, Pennsylvania Turnpike Commission engineer, before the Highway Officials of the North Atlantic States, New York, February 1950.

^b On November 17, 1943 the Turnpike Commission, by resolution, determined that an additional \$3,000,000 would be required to provide final payment in full of the entire cost of the project; \$1,500,000 of this amount was offered and immediately sold to private bankers.

were sufficient to pay maintenance and operating costs, plus 1.5 million dollars of interest charges, with a balance of \$722,000 for debt retirement.

With the restrictions on motor vehicle use imposed by war, traffic dropped to 3,000 vehicles a day, and revenues during the three fiscal years 1943 to 1945 failed by 1.4 million dollars to cover the combined requirements

for interest and maintenance.⁵ With the end of the war traffic rose sharply, and in the 30 months from June 1947 through November 1949 average use was 10,000 vehicles per day. On an annual basis 1949 traffic volume exceeded 1941 by 56.3 per cent and represented a 13 per cent increase over 1948. (See table on page 98.)

One of the most significant factors in the improved revenue position has been the rapid increase in use of the facility by heavy-duty trucks. Toll payments by these vehicles have increased from 32.3 per cent of revenue in 1940-41 to 60.4 per cent in 1949, although accounting for only 9.9 and 21.4 per cent respectively of all vehicles using the Turnpike.⁶

With the opening of both the Philadelphia and western extensions, the toll charge for the entire 327-mile trip will be \$3.25 for a passenger car and as much as \$20.50 for a heavy truck-trailer combination. On the basis of such a toll schedule, revenues of 17.5 million dollars are anticipated for 1952 with a constant upward trend. Net revenues are expected to range from 10 million dollars in 1952 to over 20 millions in 1988. (See Appendix Table, pages 194-95.) The interest charge on serial bonds totaling 47 million dollars is currently \$1,057,500. When the two issues of term bonds are added, annual interest charges will range from \$6,098,750 in 1953 down to \$287,633 in 1988. If the estimated net revenues are realized, the deposits to the credit of the sinking fund

⁵ See the table on page 97. The General Assembly in 1945 authorized the Turnpike to issue revenue bonds for war emergency financing of interest and sinking fund requirements, but the end of the war obviated the necessity for this legislation.

⁶ See table p. 82. That this trend is continuing is evidenced by revenue statistics for the fiscal year 1950; trucks accounted for 64.4 per cent of revenues, though making up only 24 per cent of traffic. *Highway Highlights*, September 1950, p. 3,

are calculated to be sufficient to retire all serial bonds by June 1, 1956 and all term bonds by June 1, 1965; the maturity dates for these issues are 1968 and 1988 respectively.

PENNSYLVANIA TURNPIKE, RECEIPTS AND EXPENDITURES 1941-49^a
(In thousands of dollars)

Fiscal Year ended May 31	Receipts			Expenditures			Receipts less Expendi- tures
	Tolls	Other	Total	Operation and Main- te- nance	Inter- est	Total	
1941 ^b	\$1,418	\$111	\$1,529	\$ 651	\$1,020	\$1,671	\$-142
1942.....	2,875	216	3,091	839	1,530	2,369	722
1943.....	1,879	90	1,969	814	1,530	2,344	-375
1944.....	1,708	77	1,785	781	1,554	2,335	-550
1945.....	1,820	86	1,906	745	1,586	2,331	-425
1946.....	2,689	216	2,905	779	1,586	2,365	540
1947.....	3,801	319	4,120	999	1,250	2,249	1,871
1948.....	4,844	337	5,181	1,186	1,150	2,336	2,845
1949	5,958	362	6,320	1,334	884	2,168	4,152
1950.....	7,173	367	7,540	1,315	1,058	2,373	5,167

^a From statements prepared by the Turnpike Commission.

^b Eight Months. Turnpike was opened to traffic Oct. 1, 1940.

Current indications that the turnpike may prove to be a self-liquidating undertaking afford no reason for assuming that similar projects will pay out on the basis of full economic costs. In the first place, it may be assumed that without the substantial federal subsidy the Pennsylvania Turnpike would not have been built. Moreover, the project was built in a period of relatively low prices. Consequently, the Commission enjoys the advantage of paying off a low-cost prewar investment with toll rates at a level particularly attractive in a period of postwar inflation. This factor tends to offset the

TOLL ROADS

high financing charges resulting from the fact that the Pennsylvania project was an untested experiment.

What the effect of today's higher construction costs may be on toll rates and therefore on toll-road patron-

PENNSYLVANIA TURNPIKE, TREND IN NUMBER OF VEHICLES^a

Month	Thousands of Vehicles			Percentage Increase	
	1941	1948	1949	1949 over 1941	1949 over 1948
January.....	98	149	201	105.1	34.9
February.....	87	148	182	109.2	23.0
March.....	123	211	227	84.6	7.6
April.....	184	240	292	58.7	21.7
May.....	217	298	335	54.4	12.4
June.....	252	342	379	50.4	10.8
July.....	322	429	479	48.8	11.7
August.....	369	432	471	27.6	9.0
September.....	257	368	410	59.5	11.4
October.....	216	311	344	59.3	10.6
November.....	182	259	277	52.2	6.9
December.....	153	218	247	61.4	13.3
Total.....	2,460	3,405	3,844	56.3	12.9

^a From Reports of the Pennsylvania Turnpike Commission, Harrisburg, Pa.

age remains to be seen. An indication may be provided when both the Philadelphia and western extensions have been completed.⁷ To a considerable extent the validity of this test will be diminished, however, by the fact that all parts of the turnpike project have been grouped together for financing purposes, so that the benefits of the original federal grant and the lower costs

⁷ The Philadelphia extension was opened in late 1950, with the toll remaining at approximately 1 cent per mile for passenger cars. During the first full month in which the new section was operating, there was a 53 per cent increase in Turnpike revenues over revenues realized on the original section during the same month of 1949.

of prewar construction will be reflected in the total 211.5 million dollar project.

Another consideration makes it hazardous to estimate the financial prospects of other toll roads on the basis of the financial showing of the Pennsylvania Turnpike. As already noted the original section of this road was designed to overcome the extreme grades and curvatures through the mountainous territory likewise served by parallel U. S. Route 30. The resulting savings in operating costs have proved particularly attractive to heavy-duty truck operations. Difficulties of terrain, however, are not the only obstacles which might induce traffic to shift from a parallel free road to a more adequately designed toll road. For example, traffic congestion in highly built-up areas may be an equally powerful factor in persuading motor vehicle users to pay the extra cost of traveling on a toll facility.

THE NEW HAMPSHIRE TURNPIKE

The financial outlook for the New Hampshire Turnpike, as pictured by estimates of traffic, revenues, and costs, is favorable. The engineering report to the State Highway Department estimated that 1,949,000 vehicles would use the turnpike in 1950, and that with a toll of one cent per vehicle mile this traffic would produce revenue of \$323,000. Annual operating costs were estimated at \$75,000 to \$80,000. Payment of debt service on 7.5 million dollars of bonds could be accomplished in less than 30 years, at interest rates of either 1.75 or 2.5 per cent.⁸

Because the estimates indicated no likelihood of financial difficulties, it was decided to abandon revenue-bond

⁸ *Transport Topics*, Oct. 18, 1948, p. 54.

financing and borrow on the general credit of the state, with the understanding that the debt would be repaid out of tolls. In this way the credit of the state would make possible low interest rates, but the possibility of any need for state aid was remote. In addition, there were some who felt that even if the toll road were to be financed with revenue bonds, the state would have a moral obligation to take over the road if it failed. Actually construction of the road was accomplished without a bond issue, by short-term loans from the state treasury.

Actual data for 1950 differ from the estimates of New Hampshire turnpike traffic and revenues but the net result substantiates the favorable outlook. Toll collections were started on June 25, 1950 and traffic for the somewhat more than five months of operation was 1.4 million vehicles. Toll receipts of \$228,000 were nearly \$100,000 less than estimated. On the other hand, construction costs of \$6.8 millions were lower than anticipated and expenses of maintenance and operation for 1950 were only \$56,000. Experience in 1950 indicates that revenues will exceed maintenance and operating costs, plus interest and amortization, by 8 to 10 per cent.⁹

MASSACHUSETTS

When the Massachusetts Turnpike Commission was created in 1949, it was authorized to study the feasibility of a specific route from the Connecticut line diagonally northeastward to the New Hampshire line.¹⁰ The position taken by the Commission in its report to the legislature was against the toll facility on the grounds that

⁹ Information from Frank D. Merrill, Commissioner, New Hampshire Department of Public Works and Highways.

¹⁰ The Massachusetts Turnpike Commission was created by Chap. 76, Resolves of 1949.

the state had already launched a full-scale attack on the highway problem by an issue of 100 million dollars of general revenue bonds. In addition, a recent message from the governor had already recommended the second 100 million dollar issue to carry the program forward. The report acknowledge, however, the need for further highway modernization, and pointed out that:

Comparisons of highway construction between the state of Connecticut and Massachusetts were detrimental to this Commonwealth when tourists, businessmen or industrialists viewed the modern superhighway system of the Merritt Parkway and the Wilbur Cross Highway after driving from Route 20 in this state and along the narrow, hazardous Route 15.¹¹

For this reason, the state had already arranged to modernize Route 15 to provide a better link with the Connecticut highways. In addition, the Commission outlined various other projects being undertaken with the first 100 million dollar bond issue, all of which would be under contract by the middle of 1950. The proposed toll expressway, which would be 94 miles in length and would cost 60 million dollars, was viewed unfavorably, however, principally on the grounds that toll roads to date have not proved economically sound. Also, "if the roads are needed and a moderate increase of 2 cents per gallon to the present gasoline tax were obtained, the additional revenue would be many times greater than that produced by a single toll road."¹² With respect to the specific route under study, it was found by origin and destination surveys that there would be only half as much traffic using the road as would be necessary to

¹¹ *Report of the Massachusetts Turnpike Commission*, H. Doc. 2323, March 1950, p. 9.

¹² The same, p. 14.

pay its cost. It was estimated that 15,000 vehicles a day would be required by 1970 to retire the debt of 60 million dollars over a 30-year period, whereas only 7,500 vehicles per day would use the route.¹³ An obvious reason for this deficit is the fact that the road would bypass the Boston metropolitan area, which is the greatest traffic generator in the state.

Public reaction to the toll road proposed was more favorable. Of the 34,510 persons interviewed during the traffic survey who were asked if they would use a toll road, 84.5 per cent said "yes."¹⁴ The Committee concluded, however, in rejecting the proposed toll road that there was "no demand for such a project," and that it was "the opinion of the members of this Commission that the construction of a toll highway is not the economic salvation of anything."¹⁵

A further factor in the position taken by the Massachusetts Turnpike Commission was the belief that a toll facility might expedite traffic to the point of impairing business in the Commonwealth.

Millions of dollars are spent here each year by out of state visitors. It is not the desire of the members of this Commission and we are sure of the members of the General Court and also the businessmen to quickly transport these visitors through the state. A toll express highway does not produce revenue for the business in the state—even if such a highway was financially sound.¹⁶

In view of this desire that the out-of-state visitors to Massachusetts "should be encouraged to remain and

¹³ It was assumed that the toll would be \$1.00 for a through trip, and that the average toll would be 80 cents.

¹⁴ The same, p. 30.

¹⁵ The same, p. 19.

¹⁶ The same, p. 20.

enjoy the many facilities this Commonwealth has to offer," it was felt that the facilities being improved under the general bond issue would suffice "for the orderly movement of traffic" presumably without unduly speeding the departing guest. It was also noted that automobile owners from states with toll highways are now enjoying the highways of Massachusetts without toll charge and therefore the Commonwealth should consider as a means of obtaining additional revenue "the erection of one or more toll bridges adjacent to these so-called toll highway states." The Commission attached proposed legislation to its report calling for further study by the Massachusetts Turnpike Commission of such a toll bridge program.

COLORADO

Study of a superhighway route from Boulder to Denver led to the conclusion in 1948 that such a project would not be self-supporting. Estimated annual revenues of \$259,000 were \$86,000 short of the amount required to amortize the 5.6 million dollar investment over 30 years and pay operating and maintenance costs.

In 1949 new legislation was passed to permit the state to make up the estimated deficit out of the motor vehicle tax fund.¹⁷ Under the terms of this bill a special sinking fund was to be set aside in the state highway fund, derived from registration fees and gasoline taxes, to assure payment of the principal and interest on the bonds authorized. This fund would be provided by joint resolution of the Senate and House of Representatives. It would not exceed 30 per cent of (1) the amount of principal and interest due each year, and (2) the

¹⁷ H. B. 833 approved Apr. 15, 1949.

amount required to be paid into the sinking fund as a reasonable reserve for the payment of the bonds authorized.

The State Highway Department has the authority to issue the necessary bonds on the majority vote of the entire membership of the Highway Advisory Board and the affirmative vote of the governor and state engineer (the board and officers named being the trustees of the State Highway Department). These bonds are to be payable from the tolls from any designated turnpike project, and additionally secured by a pledge of the special fund set aside from the state highway account; but the general credit of the state is not pledged. It is specified in the legislation that interest will not exceed 3 per cent and shall be payable over a period of not more than 30 years. The State Highway Department is responsible for establishing a schedule of tolls sufficient on the basis of anticipated use to pay at least 70 per cent of the principal and interest on the bonds.

To the extent that the special fund provided for is not required for the payment of the bonds and the creation of a reserve and sinking fund, the money may be used to pay the cost of maintaining, repairing, and operating the project. But under any circumstances the state is to maintain and operate the turnpike just as it does any state highway. When all bonds and interest have been provided for, the turnpike is to be maintained free of tolls.

After the passage of this legislation, it was considered impossible to obtain satisfactory financing without first testing the constitutionality of the special fund provisions. The point in question was whether a joint resolution of the legislature was sufficient to set aside money

for this purpose from the motor vehicle revenue of the state. The court has upheld this provision of the law, and construction of the project was begun in late 1950.

OKLAHOMA

An engineering report on a proposed toll road from Oklahoma City to Tulsa concluded in 1948 that while the cost would probably be 40 million dollars, prospective revenues would not support a road costing more than 25 to 30 millions.¹⁸ Accordingly, a new bill was passed in 1949 which extended the maximum maturity date of the turnpike bonds from 35 to 40 years.¹⁹ In 1950 the Oklahoma Turnpike Authority awarded contracts for the sale of 31 million dollars of bonds at a bid of 3.4 per cent interest, but further action was stopped pending court action. In late 1950, however, the U. S. Supreme Court refused to hear an appeal by opponents seeking to enjoin the Authority from building the road.

EFFECTS OF POSSIBLE TOLL-ROAD FAILURE

It may be concluded from analysis of turnpike experience to date that the possibilities of such facilities paying their way is generally good provided that careful selection of the route has been made to assure a facility which will provide sufficient attraction to draw traffic in substantial volume. Where selection of the route is not properly made, or where other factors reduce the diversion of traffic from existing public ways, there is a real possibility that a toll road would be unable to pay its way in total. In that case it is likely that the state would take over the facility even though no gen-

¹⁸ *Roads and Streets*, June 1948, p. 59.

¹⁹ H.R. 197, approved May 31, 1949.

eral obligation bonds had been issued. For this reason it is argued that a project which was originally conceived as requiring no general tax support would in the end become a liability of the state and a financial drain on the highway fund.

Granted that the state would undoubtedly take over a financially insolvent but physically sound toll facility, it by no means follows that the highway fund should suffer. On the contrary there is no inherent reason why a hard bargain could not be driven, for the bankrupt facility could be acquired on the basis of court valuation or current earning power, neither of which would have any necessary relation to outstanding debt. In that case the highway user would pay no more for the facility than would have been the case had it been constructed originally as a free road. Up to the point of insolvency, debt service and operating costs would have been borne by toll payers. At the time of acquisition by the state the facility could be recapitalized and general obligation bonds exchanged for the revenue bonds. The state could then continue to operate the facility as a toll road at reduced rates, and use the revenues to service the scaled-down debt. Or it could incorporate the facility into the free-road system and increase user charges in the amount necessary to support the additional road plant.

In the situation outlined, the entire loss is borne by the original purchasers of the revenue bonds. This is an integral part of the function of risk-taking. The risk is assumed voluntarily, presumably after careful evaluation, and in the face of a specific declaration that the state has no legal or moral obligation to bail out the

undertaking in the event of financial difficulty.²⁰ The highway user or general taxpayer would suffer no financial injury unless the legislature were persuaded to take over a bankrupt facility without proper recapitalization or unless it were persuaded to assume responsibility for an obsolete or physically deteriorated property.

As a practical matter it appears doubtful that a state will be called to take over because of financial difficulties any of the toll facilities now in operation or under construction. For the most part toll-road financing to date has been underwritten by experienced institutional investors.²¹ It would be rash to assume that these groups are depending on unpredictable legislative action for the security of such a substantial investment. On the contrary, they obviously expect the venture to pay out with a profit. In the event of default on interest occa-

²⁰ For example, the Maine *Turnpike Revenue Bond* provides:

"The State of Maine is not obligated to pay this bond or the interest hereon except from tolls, and the faith and credit of the State are not pledged to the payment of the principal of or the interest on this bond. The issuance of this bond shall not directly or indirectly or contingently obligate the State of Maine to levy or to pledge any form of taxation whatever for the payment of this bond or the interest hereon or to make any appropriation for such payment." (Trust Indenture, Maine Turnpike Authority to First National Bank of Boston and National Bank of Commerce of Portland securing Turnpike Revenue Bonds due Feb. 1, 1976, p. 4.)

And in the case of the New Jersey Turnpike Authority:

"The legislation specifically provides that the faith and credit of the State are not pledged, and that the revenue bonds shall contain on the face thereof a statement to these effects. There is thus no recourse by bondholders upon the State or its political subdivisions. The security of the bondholders' investment depends entirely upon the economical and speedy completion of the Turnpike and the adequacy of revenues to be derived therefrom." New Jersey Turnpike Authority, *First Annual Report* (1949), p. 20.

²¹ For example, a group of some 50 institutional investors have made commitments to purchase the entire 220 million dollar bond issue required to finance the New Jersey Turnpike.

sioned by some temporary disruption of revenue,²² the investor would normally draw on standard reserves to compensate for the loss of income. Under such circumstances it would hardly be prudent to bring pressure to bear on the state to take over the enterprise, thereby risking a long-term loss of principal and interest. Only where the undertaking gave evidence of becoming permanently insolvent would there be any incentive for such action. But this is precisely the situation in which there would be the least prospect of securing favorable terms through state acquisition. Consequently, there is an even chance that the bondholders would elect to continue the toll-road operation under a voluntary reorganization of capital structure, the terms of which they could control or influence directly.

There are several considerations, however, which suggest that a state might acquire a financially embarrassed facility without direct monetary loss to any of the affected parties. Assume that at the end of 20 years' operation it appears that the sinking fund will be able to meet no more than 85 per cent of outstanding debt at the final maturity date—10 years later. If the facility has been adequately maintained and if the major portion of its capacity is needed to accommodate the existing volume of traffic, the state would be justified in purchasing the facility outright. The outstanding bonds could then be refunded by the issuance of general obli-

²² The Pennsylvania Turnpike experienced such disruption of expected revenue during 1942-44 because of wartime restrictions on motor vehicle use. In 1945 the General Assembly authorized the commission to issue: ". . . Revenue Bonds for War Emergency Financing of Interest and Sinking Fund requirements as well as refunding any Bonds issued and then outstanding." This emergency measure, however, was not needed. Address by G. B. Gilbert, Pennsylvania Turnpike Commission engineer, before Highway Officials of the North Atlantic States, New York, February 1950.

gation bonds secured by an appropriate increase in user charges.²³

It might be argued that such a general increase would impose an undue burden on the motor vehicle user who has little or no occasion to use the "freed" toll facility. Actually the average motor vehicle user would stand to gain by the transaction under consideration. First, the fact that the toll road carried sufficient traffic to remain solvent over a period of years would indicate that it met an effective demand for added highway capacity. If this necessary capacity had been provided at the outset by conventional financing methods, all users would have been required to pay increased gasoline taxes or license fees regardless of the extent to which they used that particular route. As it was, the toll road had been supported for two decades exclusively by those who chose to use it. In the meantime these motor vehicle owners, through the payment of taxes on gasoline consumed on the toll road, continued their support of the parallel free road at the same rate as other owners. To the extent that traffic congestion on the free road was relieved by diversion to the toll facility, the average motorist enjoyed improved service without added cost.

Another possibility of state action in case of toll-road financial difficulties, and the most simple and accept-

²³ In the case of the New Jersey Turnpike:

"The first call privilege on the bonds for the purpose of refunding or redemption as a whole is ten years after their date of issuance or some 7 to 8 years after the Turnpike is expected to begin operations. Such redemption would be effected initially at a premium of 3 per cent and at reduced premiums thereafter until 1975 when the bonds would become callable for any purpose without premium. The bonds are redeemable from earnings at any time after their issuance without premium through operation of the Sinking Fund." New Jersey Turnpike Authority, *First Annual Report*, pp. 19-20.

able solution, would be simply the granting of state financial assistance from the motor vehicle fund to aid in maintaining or operating the facility. This would be a reasonable course of action in view of the fact that motor vehicle tax revenues are generated by traffic on the turnpike, yet no provision is made to credit the toll road with these revenues.

Based on the limited experience to date, it may be concluded that a modern toll road has reasonable prospects of financial success if three conditions are met. The facility must be designed to standards which will provide service appreciably superior to that currently afforded, or in prospect on parallel free roads. Second, construction and maintenance costs and traffic potentials throughout the life of the project must be based on comprehensive surveys conducted by competent and disinterested technicians. Finally, from the outset, political and special interest considerations must be excluded from the management of the undertaking. This means that the financing costs of the project must be held to a minimum by such devices as competitive bidding and underwriting arrangements which will to the fullest extent possible avoid excessive interest costs.

PART II

ALTERNATIVES OF PUBLIC POLICY

The toll-road movement has created a serious dilemma in highway transportation. The federal government, having dedicated itself to the free-road principle and having opposed resort to tolls in the financing of federal-aid highways, is in the position of seeing important sections of the interstate highway system, in which it has a primary interest, being built to high standards as toll roads rather than free roads. And the states, which are in general dedicated to the same free-road principle, are in the position of being unable to adapt traditional methods of finance to the current needs of the highway program. Accordingly, through the dictates of expediency, they are in many cases being forced to resort to revenue bonds secured by tolls.

The previous chapters have indicated some of the advantages and disadvantages of toll roads, as well as the factors to which the spread of the toll-road movement may be attributed. In the light of these facts, the questions to be answered are clear. First, if the toll-road solution is to be avoided, what alternatives are available to a state confronted with inadequate financial methods? Second, to what extent and in what ways might the federal government alter present federal-aid policies to assist the states either in effecting necessary revision of highway management or in compensating for its shortcomings? Third, if existing policies cannot be sufficiently revised at either the state or federal level to assure a satisfactory highway program, can established methods of finance be supplemented with toll finance so as to realize the benefit of this financial tool without undue disadvantage to the highway program as a whole?

CHAPTER VI

REVISION OF STATE HIGHWAY POLICY

Theoretically, solution of the problem of providing high-cost facilities on main highway routes can be achieved through traditional financing methods without resort to tolls. The requirement is to obtain the necessary funds and apply them to the routes in need of improvement. In most cases the magnitude of the needs would require borrowing, with the proceeds of the bond issue dedicated to the specific highways to be constructed. Tax rates might have to be raised to service the debt, and the revenues so earned would have to be earmarked for this purpose.

The approach to meeting main-road requirements through the basic financial tools already established has been described by one highway official in the following detail. First, 30-year bonds secured by the credit of the state would be issued, and payment of the bonds provided for out of highway user revenue. The proceeds of this bond issue would be limited to routes built with control of access from abutting properties. These routes would include the Interstate System and roads of comparable importance. An increase in highway user tax rates would be provided, with the income earmarked for direct expenditure or for retirement and interest payments on the bonds sold to finance these routes.

With the aid of bond financing of toll-free roads we can meet the challenge and develop rapidly the facilities so urgently needed. And, there can be no more effective way to counter the sincere but unjustified enthusiasm for toll roads.

With the initiation of an adequate alternative free road plan, the toll road issue will be dead.¹

A similar approach to solving the highway problem through needed revisions in state policy points out that "wherever a toll road is proposed there will be two conditions: First, a large stream of traffic to be accommodated, and second, an inadequate free highway."

Now, these are precisely the conditions which justify and demand prompt and adequate improvement of the existing highway serving the stream of traffic. The route involved is a part of the general public highway system. It is evidently a route of high importance in that system. In the public treasury there are funds, collected from highway users generally, which are dedicated to the adequate improvement of the system in all its parts. Here, then, upon this route, the evidence shows, is a place where a portion of those funds should be expended now and expended in amount sufficient to afford adequate service to this large stream of traffic.²

It is contended under these circumstances that either through current financing or through bonding, "the public highway authorities are bound, in a proper exercise of their functions, to effect the required adequate improvement promptly. If the public highway authorities do not so act, the fault is with the highway authorities and the remedy lies in a correction of that fault."³

There is no question that in principle the sound approach to solving our highway problem today lies pre-

¹ Address by R. E. Jorgenson, Deputy Commissioner, Connecticut State Highway Department before Third Highway Transportation Congress, National Highway Users Conference, 1950.

² *The Case Against Toll Roads*, an address by H. S. Fairbank, Deputy Commissioner, Bureau of Public Roads, before the Highway Division, American Society of Civil Engineers, 1948. (Mimeographed.)

³ The same.

cisely in the direction outlined above. But our demonstrated failure to act along the very lines here proposed is the basic reason for the emergence of the toll road. Under existing conditions, the steps outlined above are not the solution to the toll-road problem, but rather a statement of the problem itself. The toll-road movement has developed out of the failure of public highway management, because of political interferences, to apply the tools available to it in a manner productive of effective highway development. In many states special highway taxes are not being used in accordance with the benefit theory on which they were predicated. Highway funds are being allocated among the various road and street systems often with little regard for traffic needs. In addition, despite the heavy investment involved in main-road modernization and the impracticability of attempting to finance such programs out of current revenues, many states have failed to accelerate needed highway construction through borrowing. Finally, in half the states no provision of any kind has thus far been made to assure that main-road investment in the future will be protected from the inevitable loss which follows from failure to insulate the traveled way from the encroachments of abutting land uses.

In previous chapters it has been seen that substantial opposition is encountered when attempts are made to alter defective highway policies. Opposition to borrowing and to tax increases and resistance to allocating motor vehicle tax revenues in accordance with traffic requirements have contributed to the highway financing problem. Although the correction of these long-standing policy defects is necessary to an ultimate solution of the highway problem, such action may provide no

solution to the immediate difficulties which the persistence of these defects over a period of time have created. The task today is to effect such changes as will provide immediate compensation for inadequate policies as well as a long-run solution. In this effort the states and the federal government each have important roles to play.

What can the states do, then, when seemingly confronted with the choice of toll roads or inadequate free roads, to obtain the necessary funds and concentration of effort to provide the roads they need? Is there no possibility of achieving in practice the steps which are generally agreed upon in theory? A basic weakness to be overcome is the absence of any real effort to get the facts about the highway financing problem, analyze them, and present them to the public and the legislature for objective appraisal. In many cases resort to toll finance appears to have been decided by default, without public airing either of the nature of the problems facing the state, or of the alternative approaches to their solution. Both the public and state legislative bodies have been in the position of resolving the highway financing issue largely on the basis of positions taken by interests which are organized to exert influence on highway legislation regardless of whether or not their positions reflect sound public policy.

A fundamental reason for the widespread failure to arrive at a sound solution to the highway problem is the failure to recognize that the highway is only one among a number of elements which together provide highway transportation service, and that all of the factors contributing to the final service need to be considered in decisions regarding the economics of the highway pro-

gram. The problem of financing our highways cannot be solved in isolation, but must be related to the total cost and quality of the final service. We cannot determine how much money could be productively spent for highways without considering the effect of various levels of highway expenditure on the total cost of all the elements entering into motor vehicle operation. Since an unsurfaced highway causes excessive vehicle operating costs, the improvement of such a road will reduce costs, including vehicle depreciation, tire wear, and gasoline consumption; and a net reduction in the cost of transportation may thus be achieved despite the outlay required to improve the road. Similarly, reduction of operating costs, time losses, and accidents can be realized when facilities inadequate to accommodate the traffic using them are replaced by roads and streets which permit safe and expeditious vehicle movement. This balancing of costs and benefits provides a valuable guide to highway investment policies.

The fact that public highway agencies have failed to make a case for policy reform and have been unable to convince the legislature or the public of the merits of their own programs is the condition on which the adoption of unsound solutions has thrived. This failure on the part of the public agency may be attributed not only to an absence of factual data and their convincing presentation, but to the political complexion of highway administration. The attitude of the motorist under these circumstances is being demonstrated by the current acceptance of the toll highway. Since the public is given no assurance that taxes paid for highways will be used to finance the roads most in need of improvement, a specific payment for a specific and assured service has appealed as more acceptable. The motorist rejects a

nominal increase in the gasoline tax levied for some unspecified use, and pays a toll equivalent to a tax of 15 or 20 cents a gallon for use of the type of road he wants.

TAXES VERSUS TOLLS

The phenomenal expansion of highway transportation that occurred between 1920 and 1940 was financed in major respects by a unique system of user charges. This specialized system of finance, built on gallonage gasoline taxes and graduated license fees,⁴ proved remarkably productive of revenue with nominal administrative costs. Grounded on sound principles of public finance, the concept of user charging gained universal acceptance. Over a period of 30 years user charges have supplied over 20 billion dollars for highway development.

Moreover, this method of financing has had the merit of introducing into government planning and finance some of the advantages found in the private sector of the economy. The user charge has provided a reasonably accurate indication of the volume of revenues to be anticipated over a period of time, thus permitting an orderly and planned development rather than sporadic efforts resulting from unpredictable legislative appropriations. These charges have also to some degree impressed upon the road planner the desirability of weighing the revenue-producing possibilities of a highway project against the costs to be incurred, thus aiding in the selection of project types and priorities, and indirectly promoting an economic use of resources.

During recent years, however, doubt has arisen as to

⁴ The registration fee was designed to reflect the greater road requirements of the larger and heavier vehicles, whereas the road toll affixed to the price of gasoline was an attempt to take into account the varying extent to which individual vehicles operated.

the ability of this system of charging to supply the revenues necessary for highway modernization and at the same time to distribute the financial burden with an acceptable degree of equity among the various classes of motor vehicle users. Three major factors are involved.

1. User taxes levied at state-wide uniform rates fail to reflect the wide variations in the cost of highways. Thus even for the same class of vehicles, passenger cars for example, the gasoline tax fails to reflect the widely varying costs involved in providing service on the different classes of roads in the highway system. At an earlier period in highway development this inherent inflexibility of the gasoline tax as a service charge was of less significance than now because most segments of the roads being supported by motor vehicle taxes were closely comparable in design and cost.

Today, however, the changing volume and composition of traffic has introduced wide variations in highway design, ranging from the unimproved local road to the four-lane divided expressway with grade separations, access control, and other modern refinement. A service charge levied at a flat rate per gallon of gasoline fails to reflect the wide variations in the cost of providing these roads. Annual highway costs computed on a vehicle-mile basis indicate that unit costs of a secondary or access road usually exceed those for a high-type multiple-lane artery by a substantial margin. For example, the estimated annual cost per vehicle mile of travel on Michigan highways ranged from 7 mills for state trunk lines to 29.6 mills for county local roads.⁵ Cor-

⁵ Based on a twelve-year program outlined in Michigan Good Roads Federation, *Highway Needs in Michigan*, 1948.

responding annual costs per mile of vehicle travel on Oregon highways ranged from 9.1 mills for the state primary system to 42.5 mills for county local roads.⁶

The rapid growth of heavy truck and bus operations, too, has contributed substantially to the problem of relating user charges to the cost of the service rendered. The growth of commercial traffic has replaced the once homogeneous traffic pattern by a complex of vehicles ranging in gross weight from 1 to 50 tons, with widely different space requirements and operating speeds. To a limited extent the differential costs incurred in providing facilities capable of accommodating this mixed traffic are compensated for by the fact that the operator of the heavy-duty vehicle pays more gasoline taxes per mile of highway use than does a passenger car owner.⁷

In order to compensate for these differential costs, all states have introduced a variety of supplementary charges consisting of graduated fees related to gross weight or rated carrying capacity, gross ton-mile taxes or gross earnings. Even with these compensatory fees, however, it is not possible to construct an equitable system of user charges so long as the states depend exclusively on user revenues to support roads and streets of

⁶ *Highway Transportation System in Oregon: Present and Future Needs*, a report prepared for the Legislative Interim Committee for the Study of Highway, Road and Street Needs, Revenue and Taxation (1948).

The implications of these and other variations in highway costs were set forth in an unpublished paper titled "Some Preliminary Work in Highway Tax Analysis" prepared by George P. St. Clair for the midyear meeting of the Highway Research Board, Committee on Highway Finance and Taxation, June 1949.

⁷ The bulk of American passenger automobiles obtain from 10 to 22 miles per gallon of gasoline while the typical heavy-duty truck ranges from 3.5 to 5 miles per gallon.

widely varying use, benefit, and cost characteristics. It is this defect in the highway user tax which supports the contention that property taxes should be levied for roads to provide additional funds in excess of direct earnings from traffic. These property taxes would be similar to a surcharge against those who use such high unit-cost facilities to gain access to their property. A property tax of the proper magnitude would, therefore, in reality take the place of a toll system as a means of collecting the requirements in excess of the user revenues generated on low-density roads.

Theoretically, then, the direct toll method of raising revenue for highway support could be more readily justified on the secondary or local system where the cost per vehicle mile is highest than on main roads where the outlay per vehicle mile of travel is lowest. For the outstanding merit of the toll system is its ability to assess costs accurately and directly in accordance with costs incurred and benefits received. By the same test the conventional system of user charges is best adapted to the financing of major arteries which are characteristically designed to fairly uniform standards, and which therefore involve a relatively small variation in cost per mile. In fact, however, political considerations during the past twenty years have forced the extension of this method of finance to all classes of roads.

2. The dispersion of highway user revenue violates the principle of special charging. Two principles underlie and validate the use of special taxes to finance a governmental service. First, special charges rather than general taxes are appropriate when certain individuals or groups receive benefits different in nature and extent

from those enjoyed by taxpayers generally. Second, it follows that the practice of special charging remains valid only so long as the proceeds are applied to support the facilities demanded and used by those who pay the special levies. During the 1930's, however, there appeared marked tendencies to violate this principle governing the expenditure of user funds. One of the major abuses was the application of user-tax revenues to support large mileages of local roads whose existence, condition, and use were of incidental interest to the bulk of motor vehicle owners.

This dispersion of user funds occurred in two principal ways. First, state road systems, comprising primary routes supported in the main by gasoline taxes and license fees, were expanded to include county and township roads, many of which would not conceivably qualify for support from the motor vehicle tax fund. In addition, several states assumed complete responsibility for the provision of all rural road facilities, thereby relieving general taxpayers of any contribution to rural road support.⁸ Second, local governments were granted substantial allocations of state-collected motor vehicle user charges to aid in the maintenance of the roads that remained under local jurisdiction, a large percentage of which were little-used roads accounting for minor contributions to the highway user tax fund.⁹ Under the pressure of declining revenues and unemploy-

⁸ This action was taken in Delaware in 1935; North Carolina, 1931; West Virginia, 1933; and Virginia, with the exception of 3 counties, 1932.

⁹ For an extreme example of such dispersion see C. L. Dearing and Wilfred Owen, *The Highway Problem in Pennsylvania*, a report submitted to the Joint State Government Commission of the General Assembly of the Commonwealth of Pennsylvania (1946).

ment relief demands during the depression years, many states also diverted substantial amounts of highway funds to purposes wholly unrelated to highway provision.¹⁰

The net effect of these trends has been a progressive shift of the burden of highway support from general taxpayers to motor vehicle owners. This increasing financial responsibility of the motor vehicle owner was accompanied by a sharp decline both in the amount of road expenditures made by local agencies and in the proportion of this amount accounted for by local taxes. Between 1931 and 1941 total current revenues available to county and other local highway agencies decreased from 703 to 564 million dollars, or 20 per cent. But property taxes available to local governments for road purposes decreased 47 per cent, while transfers of state-collected highway user imposts increased 38 per cent. (See table, page 125.)

There are two significant aspects of this shift of responsibility as related to the principle of special taxation. Local roads, whether transferred to state jurisdiction or retained by local highway agencies, carry an extremely low density of traffic; and although they are maintained at relatively low standards of service, they are high-cost facilities as measured by expenditures per vehicle mile. These roads serve almost exclusively as land-access facilities, and the benefits they generate are realized directly by property owners and local residents rather than by motor vehicle users as a general class. When the financial support of these roads shifts from the

¹⁰ However, 20 states have enacted constitutional amendments prohibiting the use of special highway revenues for other than highway purposes.

local taxpayer to motor vehicle users as a whole, therefore, the benefit tax principle, that those who use the service should pay the cost, is violated. The major result of this misuse of available highway funds has been a progressive lag between the rate of modernization on the main arteries of rural travel and the increasing traffic

FUNDS AVAILABLE TO COUNTY AND LOCAL HIGHWAY AGENCIES
1931 AND 1941^a
(In thousands of dollars)

	Funds Available		Per cent of Total Revenue		Per cent change 1931 to 1941
	1931	1941	1931	1941	
Transfers from state governments					
Highway user imposts..	\$202,023	\$279,606	28.7	49.6	+38.4
Other.....	7,392	11,980	1.1	2.1	+62.1
Total.....	\$209,415	\$291,586	29.8	51.7	+39.2
Property taxes.....	355,175	189,073	50.5	33.6	-46.8
All other sources.....	138,527	82,928	19.7	14.7	-40.1
Total current revenue....	\$703,117	\$563,587	100.0	100.0	-19.8

^a U.S. Bureau of Public Roads, *The Financing of Highways by Counties and Local Rural Governments, 1931-1941*, (1949). Adapted from Table 6, p. 18.

load carried by those facilities. It is this situation which has been responsible in large measure for the pressure for toll financing as an alternative method of achieving needed main road modernization. Even if the accepted principles of user charging were restored, the future serviceability of this system would depend on marked improvement in the legislative method of fixing rates and constructing tax schedules.

3. The legislative process is cumbersome and unsci-

entific as an instrument for constructing a workable and equitable schedule of user charges. Legislative bodies have never made a distinguished record in the field of price fixing. For this reason more than half a century ago we abandoned in this country any effort to set transportation and public utility rates by direct legislative action. The function has for many years been performed by so-called "independent commissions." For example, the national Congress created the Interstate Commerce Commission more than sixty years ago. It was insulated as far as possible from political pressures,¹¹ and over the years has been given wide discretion in the establishment of fair, just, and reasonable transportation rates. The objective has been to assure impartiality, continuity of policy, and stability of the rate structure.

The problem of establishing equitable and administratively feasible schedules of charges for highway use is as complex and controversial as rate making in any other field. Yet state legislatures have universally retained direct jurisdiction over this task. The inevitable result has been political manipulation, inexpertness, and instability in the level and composition of highway user charges.

From experience to date there is no reason to believe that state legislatures can be expected to acquire the necessary technical competence and imperviousness to pressure groups required for the construction of a stable and scientifically sound system of pricing for highway service. The obstacles are illustrated by recent experience in California. The legislature in 1945 created the

¹¹ Its membership is bipartisan with overlapping terms of seven years.

Joint Fact-Finding Committee on Highways, Streets, and Bridges to study the problem of providing an integrated state-wide improvement program and to make specific recommendations for its solution. The committee conducted intensive investigations for more than a year, aided by out-of-state engineering and financial specialists, and presented their findings and recommendations to a special session of the legislature called exclusively for that purpose.

After almost six months of deliberation, a program was adopted providing for substantial improvement in general highway administration and for sharply increased rates of motor vehicle taxation. The legislature, however, rejected many important recommendations of the committee's staff as well as essential features of the recommendations of the Joint Committee.¹² But less than three years after the adoption of the legislation, it appeared that California needed a new highway policy and tax structure. The Chairman of the Joint Fact-finding Committee of the California Senate has recently stated:

Some progress is being made in our deplorable highway conditions but we are going too slowly. We may even be

¹² In a recent report, a California Senate Interim Committee commented on the 1947 legislation as follows: ". . . The committee recognizes that the highway-user tax structure as it applies to commercial vehicles is subjected to serious criticism by certain groups of taxpayers. The tax structure is alleged to be discriminatory and to promote tax avoidance. The committee realizes that a number of legislators share this view. We also recall that the Legislature failed to follow the recommendations of the Joint Committee on Highways, Streets, and Bridges with respect to truck taxes when it enacted comprehensive highway legislation in 1947." *Partial Report of the Senate Interim Committee on Highways, Streets, and Bridges*, (1950), p. 5.

losing ground. Our highway program needs speeding up. Revenues are too meager compared to needs for the modernization program we ought to have.

Less than 3 years ago the California Legislature passed bitterly-contested legislation to get money and improve road administration as the first step in a vastly expanded highway construction program. We raised user taxes on our motorists and truck and bus operators about 64 per cent.¹³

One clue to the failure of this program to provide a lasting solution to California's highway problem is found in the legislative compromises which gave preferred treatment to the counties and cities in the allocation of highway revenue. The Committee Chairman pointed out that the

. . . 1947 legislation was extremely important to counties and cities. We had inquired into the facts and found that local governments needed more financial assistance to meet road and street problems. Therefore, a large part of the increased tax revenues was specifically earmarked for them. Besides we improved the formulas for distributing the money. Perhaps the final legislation may have gone too far in taking care of the counties, and perhaps the cities.

In any event, counties and cities fared handsomely in the 1947 legislation. . . . It would be unreasonable to give any more support to counties and cities out of highway-user tax funds until the state highway system is completely modernized.¹⁴

Other states have encountered similar difficulties in devising equitable systems of user charges that will support the large capital investment required for highway modernization. This is true despite the fact that

¹³ Senator Randolph Collier, "Bonds—A Solution to the highway Finance Problem?" *Western Construction News*, June 15, 1950, p. 81.

¹⁴ The same.

most of them have subjected their postwar highway problem to intensive investigation, many through the device of specially created legislative commissions.¹⁵

To a substantial degree the failure of these studies to produce more satisfactory results is attributable to the sporadic nature of the effort and to the inherent defects of legislative rate making. The motor vehicle user has few direct avenues of redress against irresponsible or inexpert legislative action in this field because a state exercises a monopoly over the provision of highway services. Correction of this situation seems to lie either in greater legislative responsiveness to the engineering and financial analyses and recommendations of established state highway agencies or an eventual delegation of the rate-making function to a new agency resembling the conventional regulatory commission. It is significant that the toll-road authorities, although operating agencies as distinguished from regulatory agencies, have been delegated rate-making powers similar to those exercised by regulatory commissions. Thus in all cases the authorities are empowered to set the level of tolls to be charged for use of the facility. To this extent legislatures have relinquished direct jurisdiction over rate fixing for highway service.

BORROWING FOR HIGHWAYS

Although improvement of tax administration accompanied by a more equitable allocation of revenues is not beyond possibility, such reform would assist in pro-

¹⁵ The following states have conducted studies under the auspices of legislative or citizens committees some of which were aided by out-of-state engineering and financial consultants: California, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Mississippi, Nebraska, New Hampshire, Ohio, Oregon, South Dakota, Texas, Vermont, and Washington.

moting the development of free roads in place of toll roads only if it were accompanied by relaxation of restrictions on state borrowing. It has been noted that in many states the constitution prohibits borrowing for highways or restricts such borrowing within limits far below the amounts involved in toll-road projects.

One method of borrowing for highways without pledging the credit of the state is the arrangement adopted in Florida. The Florida State Improvement Commission is empowered to finance highways through revenue bonds secured by gasoline taxes as well as tolls, and to lease such facilities to the State Road Department. The Improvement Commission, established in 1941, is a public agency empowered to make possible the construction and financing of public works for state purposes.¹⁶ The authority of this commission includes the power to construct and operate toll roads and bridges whenever such facilities form a part of the state system of public roads. The Commission may collect rentals, tolls, or other charges. It is authorized to enter into agreements with the Road Department and other public agencies for the use of the facilities it finances and constructs. It may issue bonds having a maturity of not more than 30 years, and at no greater net interest cost than 6 per cent. These obligations may be secured not only by tolls but by the surplus of the county share of state gasoline taxes.¹⁷

¹⁶ Florida Statutes (1941) Chap. 420.

¹⁷ The Florida Constitution (Art. 9, sec. 6) provides that, beginning in 1943 and for fifty years thereafter, the proceeds of 2 cents per gallon of the tax on gasoline shall be placed monthly in the so-called "Distributive Fund" of the State Road Department, which money is allotted monthly among the counties in accordance with a specified formula. The administration of these funds is under the State Board of Administration which has the power to service all

An example of the operation of this arrangement in the case of a toll facility is the lease-purchase agreement by which the State Road Department maintains the Florida Overseas Highway. Bonds were issued by the Florida State Board of Administration. The State Road Department operates and maintains the facility and collects tolls. The Road Department also pays in rentals all amounts received by the Department from the gasoline tax surplus funds which are available for use in the county in which the Overseas Highway is located. This particular arrangement involves toll charges as well as the pledging of gasoline tax revenues. Where gasoline tax revenues are available in sufficient amount, the Florida method of revenue bond financing provides that the cost of public facilities be paid for out of such revenues.¹⁸

A similar method of revenue bond financing is in effect in Pennsylvania. In 1949 the General Assembly passed "The State Highway and Bridge Authority Act" which is a device providing for the issuance of revenue bonds secured by highway user revenues.¹⁹ Under the terms of this law, the Authority may issue 30-year bonds at interest rates not exceeding 4 per cent, and may use the proceeds to build highways which when completed are leased to the state. The bonds are paid with the proceeds of the rental.

county road bonds issued prior to 1931. After these commitments have been met, the Board of Administration remits 80 per cent of the balance to the State Road Department. This surplus fund is pledged to cover the leasing by the State Road Department of highway facilities financed with securities issued by a public body.

¹⁸ During 1948, financing of the Overseas Highway was accomplished with \$475,000 of toll revenues and \$109,000 in gasoline taxes allocated to Monroe County.

¹⁹ H. R. 566, 1949 General Assembly.

This arrangement is based on mutual co-operation between the State Highway Department and the Authority. All plans and specifications must be approved by the Department of Highways, and the Authority is empowered to lease property to the State Highway Department for a 99-year period. Interchangeability of employees, equipment, and services incidental to the construction, maintenance, and operation of road projects is provided for. The borrowing power of the Pennsylvania Authority is limited to 40 million dollars.

Although this device of "special authorities" affords a means of circumventing constitutional limitations on the incurrence of debt, it has severe limitations as a means of overcoming the existing restrictions on large-scale borrowing for highway purposes. In the first place, it does not solve the user revenue problem. Under existing allocation formulas, the state highway agencies have fixed amounts of funds available for all purposes, including maintenance of the highway system. As demonstrated by the experience in New Jersey, Maine, and other states that have adopted toll-road financing, the available funds are not sufficient to pay the service charges on any substantial amounts of new debt. Consequently, in most cases the state highway agencies cannot utilize the borrowing powers of the special authorities without seeking additional funds from the legislature. The taxes to supply these additional funds would have to be earmarked for specific projects on the major highways. But as we have seen, the political obstacles to securing such concentration of user revenues on major arteries constitute one of the major defects of current highway policy. The presence of an intermediate

agency such as a special borrowing authority does not overcome this political obstacle.²⁰

The state agency might of course choose to support borrowing by direct toll charges in order to avoid the difficulties of obtaining increased allocation of user tax revenues. In that case it would be preferable to create a toll-road authority charged with specific responsibility for the financial success of the undertaking. Consequently, it does not appear that the type of special public works authority operating in Pennsylvania and Florida offers an acceptable solution for the problem of highway modernization or a real alternative to the toll road.

CONCLUSION

This chapter has considered the need for and the various means of revising state highway policy in the interests of stability, efficiency, and equity in assigning the tax burden. Among the defects in the conventional system of highway administration and finance, some, notably the inflexibility of the gasoline tax, inhere in the system itself. But for the most part they stem from the substitution of political considerations for economic and engineering tests in highway programming, the sporadic efforts of legislatures to deal with the complicated problem of devising a scientific and equitable system of

²⁰ There has been and still is substantial borrowing for highway purposes. At the end of 1948 state obligations outstanding for highway purposes, exclusive of toll bridges and toll roads, amounted to \$1,139,000,000. Eight states accounted for two thirds of this total. U.S. Bureau of Public Roads, *Highway Statistics 1948* (1950), p. 78. Since that date several states including Maryland, Massachusetts and South Carolina have voted highway bond issues of \$100,000,000 or more.

user charges, and from self-imposed limitations on long-term borrowing for highway purposes. The most troublesome of these deficiencies are subject to correction through normal legislative processes. Even the inherent limitations of the uniform gasoline tax could be largely overcome to the extent that revenues from this method of charging were limited to major highway systems having relatively uniform use and cost characteristics.

It has also been observed that the imperfections are firmly imbedded in the conventional system of highway management. The forces which created these defects will continue to resist their elimination. In earlier periods, however, many undesirable features of highway management gave way to improved methods. Thus the inability of the township organizations to deal with modern highway problems was overcome in the main by progressive delegation of the function to county and state levels and by the improvement in the working relations between these governmental agencies. More recently the general quality of state highway administration has been raised measurably through the federal leadership provided under the federal-aid program. The prospects for further improvement through revision of federal policy is the subject of the next chapter.

CHAPTER VII

THE ROLE OF THE FEDERAL GOVERNMENT

The role of the federal government has had an important bearing on the toll-road movement in the United States. On the one hand federal-aid policy has been designed to act as a deterrent to toll-road financing by the prohibition in federal legislation against the use of federal aid on toll highways. On the other hand it has been charged that lack of positive federal action has done more to promote toll finance than the federal position against tolls has done to discourage it. The toll road, it has been charged, is "a symptom of a neglect resulting from the delay in designating the national system of interstate highways and in implementing the recommendations contained in the report to the President and the Congress on this system. . . ."¹ Both Congress and the executive agencies of the federal government have shown a tendency toward inconsistency on the question of toll highways. The Congress from time to time has given serious consideration to toll-highway legislation, and the executive branch has aided toll-road development through the Reconstruction Finance Corporation at the same time that such financing has been opposed by the Bureau of Public Roads.

The question of the position of the federal government on toll roads is of importance from several stand-

¹ Statement of William A. Stinchcomb, representing the American Automobile Association, *Federal-Aid Highway Act of 1948*, Hearings before the Subcommittee on Roads of the House Committee on Public Works, 80 Cong. 2 sess., 1948, p. 75.

points. The development of toll roads is occurring in areas often paralleling the designation of the interstate system in which the national government has the greatest interest. The possibility arises therefore that both federal and state highway agencies may lose control over important segments of the primary road system. Second, the fact that federal opposition to toll finance has apparently failed to deter the states in their resort to this financing method suggests the need for a review of the federal position enunciated in 1916.

In the Federal-Aid Road Act of 1916, the Secretary of Agriculture² was authorized to co-operate with the states in the construction of rural post roads, provided "that all roads constructed under the provisions of this act shall be free from tolls of all kinds."³ This prohibition against the imposition of toll on roads constructed with federal aid was restated in the Federal Highway Act of 1921, with the addition of the word "reconstructed."⁴

Departure from this policy was contained in legislation passed in 1927 to permit federal aid for toll bridges. This law provided that the Secretary of Agriculture might extend federal aid to any state or its political subdivisions for the construction of any toll bridge and approaches, provided that such bridge was owned and operated by the state or its subdivision. It was also stipulated that all tolls received from the operation of the bridge, less the actual cost of operation and maintenance, should be applied to the repayment of that part of the bridge cost incurred by the state or its sub-

² The Bureau of Public Roads was originally housed in the Department of Agriculture.

³ 39 Stat. 855, sec. 1.

⁴ 42 Stat. 212, sec. 9.

division. When the amount contributed by the state had been repaid from tolls, collections would cease.⁵

In 1948 a bill was introduced in the House which would have extended the provisions of the 1927 legislation to provide federal grants for the construction of toll bridges, tunnels, or highways.⁶ This bill proposed also that the federal-aid apportionment to a state might be expended for these purposes not only by the state or any political subdivision, but by any agency or instrumentality of the state or any instrumentality created by an agreement between two or more states. Thus the bill would have permitted toll roads to be constructed which might not otherwise be capable of self-support, with federal aid furnishing the type of assistance rendered through the Public Works Administration for the Pennsylvania Turnpike.

The Commissioner of Public Roads, testifying against the bill, stated that the 1927 authority to use federal-aid funds for toll bridges had not promoted such development, and that only one bridge had been built under the provisions of that legislation.⁷ Congress had been engaged primarily in the process of freeing toll bridges. Bridges freed by federal aid have involved the retirement of 18.7 million dollars of bonds since 1938, of which 8.2 million dollars was supplied by federal funds. Concerning the inclusion of toll highways as well as bridges in the federal-aid program, the Commissioner stated that the Bureau of Public Roads distinguished

⁵ 44 Stat. 1398.

⁶ H. R. 6572, 80 Cong. 2 sess.

⁷ Statement of Thomas H. MacDonald, Commissioner of Public Roads, *Roads and Bridge Legislation*, Hearings before the Subcommittee on Roads of the House Committee on Public Works, 80 Cong. 2 sess., 1948, p. 124.

sharply between toll bridges and toll roads. He pointed out that the philosophy of his organization was expressed in the report *Toll Roads and Free Roads* in which the conclusion was drawn that the encouragement of toll-road construction as a national policy would be undesirable. And while the fact is accepted that certain sections of road could be financed with tolls, "in the building of an interstate and major system of highways, it is not fair for one community to impose a toll which is made possible only by the construction of free facilities by other states or other communities."⁸

But the Commissioner left the Public Roads position open for possible further consideration. ". . . A sufficient reason for passing over the enactment of legislation of this character at this time," he said, "is the fact that we are not embarrassed by the lack of funds with which to carry on a program. . ." But he also stated:

. . . We cannot accept as a good public policy the issuance of revenue bonds to evade the limitations of bonded indebtedness which the states have imposed upon themselves or upon their communities, and their political subdivisions. I think that that is simply a subterfuge to create a debt without interfering with the legal debt limit.⁹

This latter position might be questioned on the grounds that the toll-revenue bond generally involves no liability on the part of the state. And even in the case of bonds secured by motor vehicle tax revenues there is strong argument for considering this a special financing device outside the scope of general governmental activities.

⁸ The same, p. 129.

⁹ The same, p. 130.

INTEREST IN TRANSCONTINENTAL TOLL ROADS

One of the principal declarations of federal policy with respect to toll highways is contained in the findings of a report submitted to the Congress in 1939 by the President.¹⁰ This report was prepared by the Bureau of Public Roads under provisions of the Federal-Aid Highway Act of 1938, which called for an investigation of the feasibility of building three superhighways crossing the nation from east to west and three routes running in a north to south direction. The purpose of this investigation was to determine the possibility of financing such a system of transcontinental routes through tolls.

The report, *Toll Roads and Free Roads*, has been mistakenly cited as official demonstration of the impracticability of toll-highway finance. Actually, it was directed primarily to the question of whether transcontinental expressways would provide an adequate solution to the traffic problem. With respect to the financing of heavy traffic routes through toll-revenue bonds, it provided substantial evidence to support the feasibility of tolls, if not their desirability.

The approximate total length of the six superhighway routes studied was 14,336 miles, and the cost of construction was estimated at approximately 2.9 billion dollars. Financing costs were based on a 30-year loan with annual interest of 2.6 per cent and an additional 2.24 per cent for retirement.¹¹ Toll rates proposed for these highways were 1 cent per mile for passenger cars and 3.5 cents per mile for trucks and busses. It was

¹⁰ *Toll Roads and Free Roads*, H. Doc. 272, 76 Cong. 1 sess.

¹¹ The same, p. 77.

concluded on the basis of 1960 traffic estimates that only 45.7 per cent of the annual cost of the system in that year would be covered by toll revenues at these rates, and that over the period 1945-60 less than 40 per cent of the cost would be covered.¹²

From these findings it is generally concluded that the Bureau of Public Roads found that toll financing of highways was not feasible. But what the report actually showed was that toll financing of a transcontinental system of highways was not feasible. Actually 172 miles of highway between Connecticut and New Jersey were found by the study to be capable of more than paying their way by 1960; and 1,349 miles would have been capable, on the basis of conservative traffic estimates, of paying 85 per cent of their cost through tolls. If provision had been made for crediting specific highways with the user-tax revenues generated by the traffic using them, substantially greater mileages would have been found to be self-supporting.¹³

The pessimistic picture concerning the self-liquidating prospects of the six transcontinental roads resulted from the fact that a very large part of the mileage involved was on little-traveled routes capable of paying only a small proportion of the costs that would have been incurred to provide expressway standards. On approximately 4,000 miles of the system, estimated toll collections over a 15-year period amounted to less than 20 per cent of the cost of debt service and maintenance of

¹² The same, pp. 81 and 86.

¹³ The possible propriety of such a credit was recognized, however, and the amount computed for the system as a whole. On this basis additional revenues of 15 million dollars per year would have been available, but on a system-basis the deficit would have been decreased only 14 per cent by the crediting of user revenues.

the facility. There were 1,469 miles on which 10 per cent or less of the cost would have been recouped through toll charges. The reason for this is indicated by the finding that in 1937 less than 56 toll-paying vehicles per day would travel on the 1,169 miles from Spokane, Washington to Fargo, North Dakota.¹⁴ The report concluded therefore that "direct toll highways cannot be relied upon as a sound solution of the problem of providing adequate facilities for the vitally necessary highway transportation of the United States, or to solve any considerable part of this problem."¹⁵ This conclusion did not exclude the possibility that some part of the highway problem, if not any considerable part, might be solved by toll facilities.

The conclusions reached by this report must be modified by the events which have occurred since the study was made. Estimates of the volume of traffic that would be willing to pay the toll, for example, were based on conditions obtaining in the middle 1930's, when neither consumer incomes, volume of traffic, nor the cost of express highways were as high as they are today. Fifteen years ago the degree of traffic congestion and highway inadequacy had not reached the point where the possibility of paying a toll to avoid the inadequacies of the free-road system offered any widespread appeal. Thus the estimates of possible toll-road patronage, presented in the *Toll Roads and Free Roads* report were low. Average daily traffic estimated for the Pennsylvania Turnpike route was 715 vehicles per day compared to 10,000 vehicles per day actually using the Turnpike by 1947; toll-paying traffic between Portland, Maine, and

¹⁴ H. Doc. 272, p. 85.

¹⁵ The same, p. 4.

the New Hampshire border was estimated at 1,348 per day, while traffic now using the Maine Turnpike averages in excess of 5,000 vehicles per day.

Another question raised by events subsequent to publication of the report is whether undue emphasis may have been placed on the short-run nature of highway traffic. Although highway traffic is predominantly local, the small percentage of trips covering long distances accounted even then for a substantial proportion of total vehicle miles of travel. Furthermore, it may be erroneous to assume, when traffic surveys show an absence of long-distance movements, that for this reason there is no demand for long-distance facilities. Actually the absence of facilities adequate to accommodate through traffic may to a large extent be responsible for the absence of such traffic. And the once valid assumption that traffic on any one route would be insufficient to justify parallel facilities, one for short-run and one for through movements, is now open to serious question.

Following the development of limited access highways, and of such roads as the Maine Turnpike and the Merritt Parkway, we find today that traffic needs in many areas have developed to the point where it is desirable to separate through traffic from local traffic. Moreover, as indicated in Chapter II, there has been a phenomenal increase since 1941 in heavy-duty trucking operations. The expansion in this type of highway traffic has far outstripped the over-all increase in highway use. As indicated by the experience on the Pennsylvania Turnpike, heavy-duty trucking operations contribute heavily to toll revenues. (See Chapter IV.)

The *Toll Road and Free Road* report therefore does not provide and was not intended to provide a blanket

appraisal of the feasibility of toll financing either at the time it was prepared or under the changed conditions which now obtain. But its conclusion that certain heavily traveled sections of our main highways might be so financed, leaves unanswered the question whether or to what extent the federal government should recognize as desirable what has been found to be feasible.

For a number of years prior to the war, interest in the possibility of constructing transcontinental toll highways was indicated by the introduction of bills for this purpose in the Congress of the United States. These proposals culminated in a meeting in Atlantic City during 1941, attended by congressmen and road officials interested in transcontinental toll superhighways. The system being discussed at that time was one costing between 50 and 100 billion dollars. The Chairman of the Pennsylvania Turnpike Commission was among those sponsoring the plan which was offered primarily with the idea of providing useful public works in the postwar period.¹⁶ It was stated that the proposed highway system could be paid for out of revenue bonds, with the federal government guaranteeing the interest.

Since the war a number of similar proposals have been submitted to Congress. In 1946 a bill was introduced to authorize the Transcontinental Streamlined Highway Corporation of the United States of America to plan a 12-billion dollar system of highways financed through tolls.¹⁷ In 1950 a bill was introduced establishing the Corzet Transcontinental Superhighway Commission, which would construct and operate a coast-to-coast highway, using wherever practicable such free

¹⁶ *Excavating Engineer*, February 1942, p. 113.

¹⁷ H. R. 50, 79 Cong. 2 sess.

roads and toll roads as were already built or under construction.¹⁸ This proposed legislation provided that the Bureau of Public Roads should supervise the construction and operation of any section of the highway "where the State . . . does not have proper toll-road laws or will not construct, maintain, and operate such a through superhighway within its borders." Wherever the Commission found it necessary to build sections of the road, it could issue revenue bonds secured by anticipated toll collections, "without recourse against the Federal Government." No federal funds would be spent on the project "except in the form of direct grants to offset the benefit to the national defense."

OTHER TOLL-ROAD DISCUSSIONS

The Works Financing Act of 1939, introduced to make possible increased employment through self-liquidating improvement programs, set the stage for further federal pronouncements on the toll method of financing roads. The self-liquidating projects proposed by this legislation were to be carried out through the Reconstruction Finance Corporation and were to include projects undertaken by the Department of Agriculture, the Bureau of Public Roads, the Public Works Administration, and the Rural Electrification Administration.¹⁹ This bill provided that the Bureau of Public Roads should have the power, with the approval of the RFC to

. . . fix, maintain, and collect tolls, and other charges for the use of highway improvements which shall be sufficient (after making reasonable allowances for operation and maintenance expenses for depreciation to the extent not

¹⁸ H. R. 7578, 81 Cong. 2 sess.

¹⁹ S. 2759, 76 Cong. 1 sess.

provided for by amortization and contingencies) to amortize the cost of such highway improvements with interest. . . .²⁰

It was also provided that revenues derived from such collections in excess of what was needed to operate and maintain the improvement could be used for further highway improvements.

In addition to providing for toll highways, the Works Financing Act of 1939 provided for the acquisition of land to be held as an investment by the government to permit the recoupment of values resulting from highway improvements. The Bureau of Public Roads was to have the power

. . . to acquire by purchase, but not by condemnation, for investment purposes, any real property in the vicinity of any highway improvements or Federal-aid construction if, in the opinion of the Commissioner of Public Roads and the Corporation the price at which such real property may be purchased is such as to make it probable that the United States will, as a result of appreciation in land values resulting from any highway improvement or Federal-aid construction, be able to dispose of such property, within twenty years, at such a price as to result in a profit; and to sell any such real property at public sale after advertisement and competitive bidding and upon such other terms and conditions as the Commissioner of Public Roads and the Corporation may in their judgment deem in the public interest.²¹

In testifying in favor of this legislation, the Commissioner of Public Roads pointed out that the highway improvement sections of the bill provided for improvement in four categories:

. . . First. Bridges and tunnels and similar individual proj-

²⁰ The same, sec. 5.

²¹ The same.

ects on direct toll basis. Second. Very limited mileage of toll roads, including excess taking of land. Third. Land acquisition for rights-of-way, particularly, at the outset in metropolitan areas and connecting such areas. Fourth. Express highways in metropolitan area. These are all essential parts of an adequate and truly national master plan for highway development.²²

In view of the appearance of the report entitled *Toll Roads and Free Roads*, the Commissioner was asked whether he had changed his views on toll roads since the appearance of that report. The reply was as follows:

No sir. You will recall that in my statement here I said there would be a very limited mileage of toll roads. And in our report we state there is only approximately one highway in the United States of any considerable length that would be anywhere near self-liquidating, and only such portions of that highway as would be self-liquidating have been turned in by us as a part of this plan. . . . It would be the highway from Washington to Boston.²³

Commissioner MacDonald pointed out that the possibilities of providing fully self-liquidating projects other than the single route from Washington to Boston would involve a combination of tolls, excess land takings and resale of some of those lands, and income from the gas tax and motor vehicle license fees. This approach to overcoming the inadequacies of our main road system, using a variety of financial tools to accomplish the desired end, failed to pass.

Differences of opinion with respect to federal aid were clearly demonstrated in recent hearings before the

²² Statement of Thomas H. MacDonald, Commissioner of Public Roads, *Works Financing Act of 1939*, Hearings before the Senate Committee on Banking and Currency, 76 Cong. 1 sess., 1939, p. 51.

²³ The same, p. 52.

House Public Works Committee²⁴ and at the Third Highway Transportation Congress.²⁵ These differences of opinion stem from the fact that we have no generally acceptable guides as to how much money the federal government should spend annually for highway development, how far the influence of federal aid should extend, how highway funds should be allocated among the states and among road systems, and to what extent federal control should be exerted over the states and local governments in carrying out the federal-aid program. One state highway official favored the elimination of federal aid altogether;²⁶ another took the position that no further increases in federal aid should be permitted: "If we persist in further demands on the federal government," he said, "the states may just as well quit the field and let the federal government do the entire job."²⁷ One proposal has been made that federal aid should be raised to a billion dollars a year.²⁸ Several organizations have taken the position that the federal government should concentrate its activities on the interstate highway system,²⁹ in contrast to the view frequently expressed that federal financing should be expanded even beyond the more than 600,000 miles now eligible for federal aid.

There has also been considerable sentiment in favor

²⁴ *Federal-Aid Highway Act of 1950*, Hearings before the House Committee on Public Works, 81 Cong. 2 sess., 1950.

²⁵ Third Highway Transportation Congress of the National Highway Users Conference held at Washington, April 1950.

²⁶ Statement of Spencer Miller, Jr., *Federal-Aid Highway Act of 1950*, Hearings, p. 376.

²⁷ E. L. Schmidt, "What is the Federal Role in the Highway Development," address before the Third Highway Transportation Congress, Washington, 1950.

²⁸ S. 3424, 81 Cong. 1 sess.

²⁹ *Federal-Aid Highway Act of 1950*, Hearings.

of a revision of federal-aid distribution and matching policies. The House version of the Federal-Aid Highway Act of 1950 proposed that 70 million dollars of federal funds be specifically allocated to the interstate system, and that matching be altered from the traditional 50-50 federal-state participation, to provide for 75 per cent of the cost to be paid out of federal funds.³⁰ And the American Automobile Association, in testimony by one of its officers before the House Committee on Public Works, suggested that half of all federal-aid money be allocated to the interstate system in order to hasten its improvement.³¹

There is ample basis for this confusion regarding the appropriate role of the federal government. Since 1935 the trend in federal-aid policy has been toward dispersal of effort while the results of all federal investigations of the road problem clearly support concentration on a strictly limited system of major highways. Thus in its report on the toll-road question in 1939, the Bureau of Public Roads emphasized the need for developing a national system of highways connecting our principal cities. This proposed "Master Plan for Free Highway Development" led in 1941 to the appointment by the President of the National Interregional Highway Committee to investigate the need for a limited system of national highways, and to advise the Federal Works Administrator as to the desirable character of the improvements necessary on highways serving interregional traffic. This committee made its report in 1944.³² The Interregional Highway Committee recommended that a

³⁰ H. R. 7398, sec. 2 (a), 81 Cong. 2 sess.

³¹ Statement of William A. Stinchcomb, *Federal-Aid Highway Act of 1950*, Hearings, p. 170.

³² *Interregional Highways*, H. Doc. 379, 78 Cong. 2 sess.

34,000-mile national system of primary roads be designated for improvement to high standards; the President in transmitting the report to Congress suggested annual expenditures on the system in the amount of \$750,000,000.

Following this report, the routes to be included in such a system were designated by the several states with the co-operation of the Bureau of Public Roads.³³ Then in the Federal-Aid Highway Act of 1948 the Commissioner of Public Roads was directed to co-operate with the state highway departments in preparing a statement of the condition of the designated national system. The Commissioner was also called upon to invite the suggestions of the Secretary of Defense and the National Security Resources Board as to their needs for highways in the interests of defense. The resulting report again emphasized the fact that "The National System of Interstate Highways is the trunk-line highway system of the United States. . . . Without doubt, this system forms the most important connected network within the highway system of the country for service of the economy of peace."³⁴

The federal government, then, since its toll road report of 1939, has been actively concerned over the status of the principal national arteries serving motor vehicle transport. Thus far it has confined its action to designating these routes and estimating the physical and financial requirements involved in their improvement to acceptable standards. With respect to progress thus far made on this system, projects completed, under

³³ In accordance with the provisions of sec. 7 of the *Federal-Aid Highway Act of 1944*. The system comprises 37,800 miles.

³⁴ *Highway Needs of the National Defense*, H. Doc. 249, 81 Cong. 1 sess., p. 2.

way, or merely in the planning stage during fiscal 1950 comprised but 7 per cent of the interstate mileage and 5 per cent of the estimated cost of improving the system. Projects actually completed during 1950 comprised 2.5 per cent of the mileage of the system and about 1.5 per cent of the cost of necessary improvements. At the 1950 rate of expenditure it would take 67 years to complete the program for the nation as a whole. On an individual state basis, some states are progressing even more slowly than others. In Ohio the length of interstate routes is 1,216.4 miles, of which only 6.3 miles were improved as federal-aid projects during 1950.³⁵

One of the most significant facts about interstate highway improvements to date is the relatively small volume of work being accomplished in the populous states where the pressure for toll roads is greatest. In the eight states of Maine, New Hampshire, Massachusetts, Rhode Island, New York, New Jersey, Maryland, and Ohio, improvements to the interstate system completed during 1949 involved 5.6 miles. This was six-tenths of one per cent of the interstate mileage improvements in that year, and less than two-tenths of one per cent of the total interstate highway mileage in those states. In a group of less densely populated states the situation was quite different. The eight states of Arizona, Colorado, Montana, New Mexico, Nevada, North Dakota, Wyoming, and Texas reported improvements on 458.1 miles of interstate routes in 1949 or approximately half of all the interstate mileage improved with federal funds in the country as a whole during that year. (See table, p. 151.)

³⁵ Data from *Work of the Public Roads Administration*, Annual Report of the Public Roads Administration, 1950 (1951).

THE INTERSTATE HIGHWAY SYSTEM, PROGRESS OF IMPROVEMENTS^a

State	Total Designated Mileage ^b	Miles Improved During 1949 ^c	Per cent of total
Selected Western States			
Arizona.....	1,136.9	36.2	3.18
Colorado.....	661.7	31.1	4.70
Montana.....	1,243.7	33.1	2.66
Nevada.....	537.3	29.4	5.47
New Mexico.....	1,012.5	35.1	3.47
North Dakota.....	498.3	57.6	11.56
Texas.....	2,764.8	163.5	5.91
Wyoming.....	972.7	72.1	7.41
Total.....	8,827.9	458.1	5.19
Selected Eastern States			
Maine.....	300.4	.4	0.13
Maryland.....	265.5	—	—
Massachusetts.....	335.8	—	—
New Hampshire.....	201.0	—	—
New Jersey.....	192.4	4.3	2.23
New York.....	1,034.3	—	—
Ohio.....	1,216.4	.9	0.07
Rhode Island.....	48.6	—	—
Total.....	3,594.4	5.6	0.16

^a Data from *Work of the Public Roads Administration*, Annual Report of the Public Roads Administration, 1949, (1950). (The Public Roads Administration is now the Bureau of Public Roads in the U. S. Department of Commerce.)

^b *Work of the Public Roads Administration*, p. 11.

^c The same, p. 94.

Concentration of federal aid on the interstate system would be a step in the direction of hastening needed improvements on that system. However, the decision made in the decade of the thirties was to expand federal participation in roadbuilding rather than concentrate these activities. As a result, the federal-aid

system has expanded from 235,000 miles of roads to more than 600,000 miles, and the possibility of realizing any rapid improvement on the few thousand miles of main routes received a serious setback. Had our policy been one of limiting federal aid to major routes of interstate importance, there might well have been an acceleration of main highway development and substantial correction of the conditions leading to the current toll-road movement.

However, the magnitude of needs on the interstate system make it by no means certain that a concentration of federal aid in the states where these needs are greatest could have averted the trend to toll finance. The attempt to finance these needs currently rather than through borrowing would in many states have met with little success.

In this connection a recent change in federal-aid highway legislation provides for the use of federal aid to retire state highway debt incurred for projects on the federal-aid system. This proposal has the merit of recognizing that the job at hand cannot be completed on a current basis; but its weakness lies in the fact that the obstacle of state debt limits is not overcome by this method. States in which general credit borrowing is prohibited are unable to take advantage of such a provision. In any event the new provision is limited by the fact that it is not possible except through constitutional amendment to bind future congresses to the authorization of federal aid in amounts sufficient to retire the state bonds. Consequently, such offerings would not be likely to attract institutional investors.

In addition to these drawbacks any proposal to increase federal highway appropriations from general

revenues carries with it the major defect of running counter to sound transportation policy. Such a program would result in substantial subsidies to highway transportation, especially commercial operations, and would thus tend to defeat the objective of achieving a soundly conceived and self-supporting national transportation system.

By grouping the major transportation functions of the government in the Department of Commerce, the President and Congress have recently expressed a growing interest in the transportation problem as a whole and in achieving more equitable competitive conditions among the several agencies of transportation. There has also been recent interest in the possibility of charging the user for the transportation facilities and services made available by the federal government. Since 1945 several requests have been made by congressional appropriations committees and the Bureau of the Budget for studies of the feasibility of airway user charges. The Civil Aeronautics Administration has issued several reports outlining possible methods of inaugurating such charges. Further federal expression in favor of user charges was presented in the report of the Secretary of Commerce to the President in 1949.³⁶

The federal attitude, then, is officially inclined to the eventual elimination of government aid which interferes unnecessarily with an efficient organization of the transportation system. At this point it would be a step backward to propose that the modernization of our main

³⁶ *Issues Involved in a Unified and Coordinated Federal Program for Transportation*, A report to the President from the Secretary of Commerce, Dec. 1, 1949.

highways, which are most competitive with other forms of transportation, should be financed by grants from general tax funds rather than by specific charges levied on the user.

ALTERNATIVES OF FEDERAL POLICY

In the interests of consistency with expressed national transportation policy there are therefore only two alternatives with respect to revision of the federal role in highway provision: retrenchment of federal participation; or concentration on a limited system of interstate highways supported by a federal system of user charges.

Retrenchment of federal activity

Sentiment in favor of discontinuing federal aid has been expressed by a number of states; namely, New Jersey, Pennsylvania, and the northeastern states generally. Major considerations have been put forward suggesting a withdrawal of the federal government from the financing of our main roads, retaining at the federal level, however, the general functions of interstate commerce regulation, collection and analysis of informational data on a uniform basis, and leadership in the formulation and co-ordination of transportation policy. It is argued, for example, that the conditions which induced the federal government to enter the field more than three decades ago no longer prevail. At that time few states had the legal jurisdiction or highway organization adequate to deal with the technical and largely novel problem of providing the type of highways required for the automotive era. There was no central agency for basic research, for the exchange of information, or for the development of uniform standards and plans for an integrated highway system. Since then all

states have centralized the highway function in large-scale highway organizations occupying permanent and important places in the structure of state and local government. These agencies employ approximately 160,000 workers and supervise the expenditure of approximately 2 billion dollars annually.³⁷ State highway officials maintain a national organization for the exchange of information, the conduct of research, and the formulation of uniform standards to govern engineering, design, and programming. Moreover, the basic physical pattern of the highway system has long since taken shape, and it might be contended that the motor vehicle user moves from one state to another impeded, if at all, by variations in the exercise of policing, taxing, and regulatory authority rather than by differences in road conditions. The opinion has also been expressed that the maintenance of desirable standards of highway management is not dependent upon federal grants, since the states construct, maintain, and own the highway plant. Motor vehicle owners can in theory obtain any correction of deficiencies in highway service by appeal to their state highway authorities and legislative bodies.

The second and more significant reason cited for retrenchment of federal appropriations for highway purposes relates to the basic principles of government. A federal system of government, such as ours, can operate successfully only so long as a workable balance is maintained in the division of powers and responsibilities between the national and state levels of government. As a practical matter this means that the functions not

³⁷ From statistical tables published by the Bureau of Public Roads, Department of Commerce, August 1949. Column "Subtotal, Current Expenditures" (Tables SF-4) added to two columns "Direct Expenditures by State" (Table SF-6) total \$1,925,065,000 for 1948.

specifically assigned to the national government by the Constitution should be left with the states unless those agencies reveal a clear inability or unwillingness to provide an essential service. It might be argued that this situation is developing with respect to the provision of highway facilities, in view of the statutory and administrative obstacles at the state level which interfere with the raising of adequate revenues for highway modernization. The imperfections in state highway management, however, have fixed themselves on the system during the period of rapidly expanding financial aid from the federal government. Consequently, it is difficult to see how the federal government under current federal-aid policy could be expected to overcome the deficiencies of state highway administration.

Concentration of federal activity

In contrast to opinion in favor of a withdrawal of the federal government from main road activity is the view that today the large volume of interstate traffic using our primary highways calls for a national system of roads planned and financed as a unit, not on the basis of previous experience with federal aid, but as a federal system comparable to our national airways and waterways. In this connection there has been considerable sentiment recently for recognizing a relation between federal excise taxes, particularly the federal gasoline tax, and the amount of federal-aid authorized for highway construction. At the present time, there is no legal relation between the two. The federal excise taxes were levied as emergency revenue sources, and federal-aid policy was never predicated on the existence of such a levy. But Congress has been increasingly disposed to

compare federal excise tax collections with federal highway grants; and a federal-aid bill introduced in 1948 cited the collection of excise taxes as the reason for the proposed extension of federal aid.³⁸ This bill pointed to the fact that over 800 million dollars was being collected in automotive excise taxes, and that the policy of the Congress was to oppose the use of state road user taxes for nonhighway purposes. According to this view, federal taxes levied specifically on road users should likewise be devoted to road purposes.

If this so-called "linkage" theory were adopted, a drastic alteration of the present allocation formula would be required. Under the principle of user charging it would be necessary to concentrate federal action on a limited system of interstate highways and to allocate the proceeds of the user taxes among the states on the basis of the proportionate cost of improving the interstate system. This would mean abandoning the grant-in-aid theory on which federal aid was predicated and which had greater validity at the time federal action was initiated three and a half decades ago than it does now. The present legal allocation formula results in a distribution among the states that bears no relationship to the amount of money required in each state to modernize the interstate highway system. If the total amount of the 1950 federal-aid apportionment (about 428 million dollars annually) were redistributed in accordance with the cost of improving the interstate system, twenty states and the District of Columbia would receive more and twenty-nine states less than they obtain under the present legal formula.³⁹ For example, at one extreme,

³⁸ H.R. 4868, 80 Cong. 2 sess.

³⁹ This formula is based on population, road mileage, and area of land owned by the national government.

California would receive 44 million dollars as against 20 million now. Connecticut, the District of Columbia, Illinois, Maryland, Massachusetts, New Jersey, Ohio, Pennsylvania, and West Virginia would receive shares ranging from 50 per cent to 150 per cent greater than the amount of the present allocation. At the other extreme, the less densely populated states with large areas such as Nevada, Iowa, Nebraska, and the Dakotas would be eligible for less than one third of the amounts now allocated to them. The position of New York, Michigan, Tennessee, Virginia, and Washington would be little changed. (See Appendix, page 196.)

Such a revision of federal highway policy might have the advantage of overcoming the reluctance of most states to concentrate their highway funds on major arteries of travel.⁴⁰ Under present policy few states have shown any disposition to speed up modernization of the interstate highway system by concentrating the funds now available to them under the federal-aid program. And if an attempt were made to correct this situation by greatly increased allocations of federal funds earmarked for application to the interstate system, there is no reason to believe that the states would revise their financial policy to the extent necessary to match these larger grants.

Despite the desirability of achieving a national system of interstate highways then, the solution of assigning the task to the federal government under traditional

⁴⁰ For the estimated annual cost of improving the interstate system to acceptable standards, see Chap. II. To accomplish this objective, it would be necessary to levy federal user charges at a rate sufficient to underwrite the entire cost of the interstate system—approximately 1 billion dollars annually. This would call for a federal gasoline tax of some 3 cents per gallon.

federal-aid arrangements has serious drawbacks. In the first place it would be necessary to reverse political trends which are as firmly imbedded in federal as in state highway policy. As we have seen, there has been an uninterrupted trend since 1935 toward dispersal rather than concentration of federal-aid funds. The original system of primary highways covering only 7 per cent of total mileage has been extended to secondary roads and city streets and now embraces almost 20 per cent of the nation's highway system.

The second and major objection is that such revision in policy would necessitate duplication of effort and create confusion of responsibility as between federal and state functions. The establishment of a system of federal user charges would mean that the national government would duplicate the administrative and taxing machinery now being used by the states to carry on their highway work. Eventually, the co-operative relation that has served in the past to delimit the federal from the state role would terminate in a conflict for primary jurisdiction over the entire field of highway provision.

The question which arises, therefore, is whether the interest of the federal government in the early completion of the interstate highway system warrants development of a federal toll-highway authority as an alternative means of financing principal intercity routes. Concentration of federal action in this manner would centralize the administrative control of toll highways in one government agency and would permit a system of through-fares for long-distance traffic with rates established on a uniform basis. However, such an approach to a solution of the main-road problem has serious weaknesses. The apparent advantages could be realized only

through the creation of a nationwide or at least regional system of toll roads. But as we have seen, the possibilities of self-supporting facilities paid for through tolls in competition with parallel free roads are not promising in sparsely settled regions. The idea of a national system of toll roads therefore overlooks the basic function of toll financing: the provision of high-cost facilities in highly selective locations as a means of overcoming obstacles which would otherwise prevent needed modernization. The special purpose nature of the toll road or toll bridge is lost when a nationwide system is contemplated. For this reason a state agency concerned with local conditions is to be preferred as the managerial unit for toll-highway financing.

CONCLUSION

The alternatives of action commonly proposed for the federal government in this field are:

1. Eliminate direct appropriations for major highway construction,⁴¹ limiting future activity to over-all formulation of policy, regulation of interstate commerce, and the conduct of basic research, thus providing a basis for eventual elimination of the federal excise tax on gasoline, and therefore an opportunity for the states to raise this revenue through their own taxes on motor fuel.
2. Concentrate effort on the interstate system supported by federal user charges levied specifically for that purpose.

A choice of these alternatives may have to be faced

⁴¹ Exception would be made of course for forest roads, national parks, military installations, and so forth.

eventually, involving fundamental decisions with respect to both principles of government and objectives of transportation policy. For the purposes of this study, however, the dilemma is that neither alternative offers a realistic solution of the problem highlighted today by the toll-road movement. It is conceivable that the elimination of federal grants for highways would provide a basis for eventual removal of federal excise taxes on gasoline, and that this might induce the states to raise their own gasoline tax rates and dedicate the proceeds to their main highways. But it is precisely the resistance to state gasoline tax increases and the use of the proceeds for main roads that underlies resort to toll finance. In any event, federal excise tax reduction could not be contemplated now in view of the emergency financial requirements of the federal government. Equally remote is the possibility today of transferring the burden of major highway modernization to the federal government to be defrayed through general taxes.

For the present, then, and in cases to be appraised by engineering studies and traffic outlook, toll finance appears to be the only ready solution to urgent highway needs when the possibility of financing these needs through traditional methods is not promising. Under these circumstances, the national government could best promote the development of a national system of main interstate arteries by removing impediments to the use of toll finance for the benefit of any state finding the method useful in the management of its highway problem. This suggests amendment to the Federal-aid Road Act to allow the charging of direct tolls on highways constructed or reconstructed with the aid of federal funds. This would mean extending to toll highways the

present federal-aid provision with respect to toll bridges. In this way the states would be afforded greater opportunity to integrate the use of toll financing with their traditional methods of administration and finance. The opportunities for and possible advantage of such integration are discussed in the following chapter.

CHAPTER VIII

INTEGRATION OF TOLL ROADS AND FREE ROADS

In the previous chapters we have seen that a theoretically sound solution to the problem of main-road improvement lies in certain basic revisions of state highway financing policies, together with changes in federal policy which will assist the states in this objective of meeting the demand for modern highways without resort to tolls. Wherever the obstacles to achieving an early revision of existing financial policies make the ideal solutions impossible, however, attention must be directed to the best means of adapting the alternative of toll finance to existing methods of state highway management. This problem of integrating the two methods is of pressing importance in view of current toll-road developments and the intention of a number of states to proceed with toll-road projects.

The toll road, as we have seen, has both advantages and disadvantages as a method of accomplishing the modernization of our main highways. The question is how these advantages can be worked into the traditional highway financing system in a way that will avoid so far as possible the disadvantages of the toll-financing method.

The toll method of financing has the basic merit of charging the cost of public highway facilities to those who demand the service, and it offers the further advantage of providing economic disciplines in the location, design, and operation of a highway. For without

assurances of the economic soundness of toll projects, it is impossible to obtain the necessary financial backing. These economic disciplines have often been lacking in state highway undertakings where political considerations, or simply the absence of any necessity for a careful weighing of costs against prospective revenues, have influenced locations, priorities, and design. These advantages might in many cases outweigh the disadvantages of the toll gate, and the higher costs incurred in the design and operation of such roads. But even more advantageous is the fact that the toll road may permit the prompt construction of a needed facility which could not otherwise be provided, so that the higher road costs involved in this decision may be more than offset by the early realization of vehicle operating economies on the modern road.

Weighing of the pros and cons of toll finance has led to the conclusion in a number of states that the toll-road solution is preferable to no road at all, while other states and the federal government have refused to endorse this financial tool, even if such refusal means a retarded highway program and false economy from the standpoint of transportation cost. Underlying these opposing positions on the toll-road question appears to be the assumption that a clear-cut choice must be made between adopting the toll road as a separate and isolated approach to the highway problem or rejecting it altogether. Actually, the toll road and the free road are not opposite or necessarily conflicting approaches but merely different ways of arriving at the same goal of furnishing needed highways. A state confronted with extensive highway requirements and powerful obstacles to their realization may find a place for certain features

of both the toll road and the free road. In the sections to follow, consideration will be given to the means by which toll finance and other financial methods might be combined to avoid the seeming conflict between them. Such integration involves three aspects of state highway policy: administration, financing, and traffic accommodation.

UNIFIED HIGHWAY ADMINISTRATION

Over a period of years the highway departments of the states have become the principal organizations dealing with highway matters. Through these organizations it has been possible to work toward a systematic approach to the problems of administering and financing the highway function. In recent years the importance of the state highway organizations as central administrative and planning agencies has been augmented by the extension of state interest to secondary road systems and urban highways. And the state departments have been the focal point for carrying out federal-aid highway activities.

This trend toward centralizing authority and responsibility has resulted from general agreement that the several systems of highways and their development must be physically co-ordinated. The establishment of toll-road authorities concerned with specific routes on the main-road system therefore raises the question whether the division of responsibility thus created is desirable from an over-all administrative standpoint.

Some states have recognized the need for a close relation between toll-road and free-road functions and have attempted to assure such a relationship by naming the state highway commissioner an ex officio member of the

toll-road authority. Various approaches have also been taken to achieve co-ordination in locating the toll road and in utilizing state highway department facilities, including engineering services, maintenance equipment, and personnel, and even financial assistance. In many cases, however, there is a lack of any significant effort to arrive at a sensible co-ordination between the two agencies despite their mutual interest in the main-road problem. (See Chapter I, page 19, and Appendix, pages 190-92.)

The reason for establishing administrative authority for a toll road in a specially created commission, thereby creating this problem of over-lapping jurisdiction and duplicating effort, is to insulate the toll road in so far as possible from political pressures which might interfere with sound plans and financing arrangements. The fact that financial support for the undertaking depends on an objective appraisal of costs and revenues has made it seem desirable to seek the necessary detachment through this administrative device. The risk of conflict between highway department and toll authority, and the sacrificing of possible economies in the joint use of personnel and equipment have been considered in some cases subordinate to the goal of insulating the toll road from the political arena.

Administrative isolation was not thought necessary, however, in New Hampshire; there the responsibility for construction and operation of the toll road was placed in the state highway department. It might be argued that such a solution was practical in this case, though it would not be in states having more extensive toll-highway plans, since the New Hampshire toll road is only 14 miles long. In response to this argument, it

should be pointed out that the amount of money involved in this 14-mile project was twice the normal construction budget for the entire state highway system, so that the turnpike was a considerable undertaking in relation to the ordinary dimensions of the New Hampshire program. Considered in relation to total highway costs, a toll highway constitutes a large undertaking in any state, making co-ordination with regular state-wide highway planning imperative.

Colorado has likewise conferred on the state highway department the responsibility for its toll road from Denver to Boulder. The financial outlook for the Colorado road did not suggest the use of general obligation bonds to finance the facility as in the case of New Hampshire. But the financing of the toll road was geared into the over-all financing of the road program by the stipulation that up to 30 per cent of the annual cost of the toll road might be financed out of state highway user taxes.

Growing realization of the wisdom of close integration of toll-road management with management of the free-road system is found in recent toll-road proposals in Nebraska, Missouri, and Minnesota. The legislatures of these states did not act favorably on the proposed toll-road bills, but the nature of the bills indicates the types of proposals that may be expected in future toll-road legislation. A bill which was defeated in the 1949 Nebraska Legislature would have authorized the Department of Roads and Irrigation to construct and maintain turnpikes and create a Turnpike Toll Fund to which would be credited the toll revenues of the turnpike or turnpikes.¹ The bonds issued under this legislation were

¹ L. B. 317, introduced Jan. 25, 1949.

not to be a debt of the state. The Department of Roads and Irrigation would let contracts in the same manner as for the construction of state highways, and the toll road would be operated and maintained by the Department. Policing would be done by the Nebraska Safety Patrol. The Department would contract for use of the right of way by utilities, gas stations, garages, restaurants, and other concessions. On retirement of the bonds the toll roads would become part of the state highway system.

A bill which failed to pass the Missouri Legislature proposed to facilitate traffic between the eastern and western sections of the state by the construction of a toll expressway by the State Highway Department from St. Louis to Kansas City.² To carry out this assignment the membership of the present highway commission would be increased from four to eight. The four additional members would be appointed in the same way that existing members of the highway commission are appointed, except that two of the additional members would be licensed civil engineers who would hold office until the expressway was completed.

A toll-road bill defeated during the 1949 session of the Minnesota legislature, designed to facilitate traffic between the southern and northern sections of the state, provided for the creation of the Forest Lake-Duluth Turnpike Commission of five members including the commissioner of highways as a member ex officio.³ This bill would have preserved the authority of the highway department in many of the basic decisions of the Turn-

² H. B. 399, introduced Jan. 1, 1949.

³ H. B. 1360, introduced Mar. 14, 1949.

pike Commission. Contracts and agreements relating to the construction of the turnpike would require approval by the commissioner of highways, and such approval would also be necessary prior to the acquisition of the rights of way. Although the turnpike would be maintained under the control of the Commission, the commissioner of highways would be responsible for actual maintenance operations. The cost of maintenance and repair incurred by the state would be repaid by the Turnpike Commission out of tolls.

Realization of the need for administrative co-ordination is found in a bill which failed in Wisconsin during 1949. Proposed legislation to establish the Wisconsin Turnpike Authority provided that at the discretion of the Authority the services of both the state highway department and county highway departments might be utilized. All such services would be paid for out of toll receipts. It was also stipulated that there should be co-operation with other states and the federal government to the end that every turnpike project would be integrated with similar projects constructed or proposed by adjoining states or similar projects proposed by the federal government.⁴

The possible benefit of insulating toll-road activity from outside interference, weighed against the undesirability of separating toll-road and free-road planning and operation, raises the question whether an authority is the more desirable form of administration. For the location and design of a toll road on economic rather than political grounds is an accomplishment which stems from the engineering and traffic studies of outside

⁴ S. B. 464, 1949.

consulting firms. It is these independent studies and not the independence of the toll-road authorities which permits successful financing of the toll road.

As assurance to the bondholder, however, it is apparent that continuity of toll-road management is desirable, and that the absence of settled personnel policies in the staffing of some state highway commissions raises a serious question. This difficulty could be overcome, however, by the appointment of an overseeing committee which would be responsible for reviewing the management of the toll facilities and submitting a periodic report to the legislature. Actual operation of the turnpikes would be a function of the highway department, however, and the maintenance and policing of the facility would be carried out through the agencies regularly assigned such duties. This integration of toll-road and free-road management would overcome the objectionable features of having two state agencies engaged in planning highway development, and in addition would remove the waste of having duplicate facilities and personnel for maintenance, operation, and policing of the two types of facilities. The fact that different parts of the highway program involve different financial tools is not a justification for separate highway administrative agencies.

FINANCIAL INTEGRATION

The inclusion of toll-road activities within the jurisdiction of the state highway department for administrative and planning purposes would accomplish one important step toward co-ordination of the toll-road with the free-road system. A second step necessary to bring

about the desired integration lies in viewing the toll method of finance in conjunction with highway financing as a whole.

It is often argued, for example, that the superimposing of a toll on the regular highway user tax system compells the user to pay twice. This so-called "double taxation" feature of the toll road is generally cited as an argument against toll financing. This objectionable feature can be overcome, however, by the device of providing that highway user tax revenues generated on a toll road be credited to the toll facility, and the toll rate reduced accordingly. How much of the tax revenue generated on the toll road should be allocated back to the specific facility would have to be determined in the light of particular circumstances. The entire amount of such revenues would not be allocated to the toll road, since the excess earnings on the main highways enable the highway department to finance the less profitable secondary feeder roads. The fact remains that some proportion of these tax earnings should in the interests of equity be made available to help finance the toll facility. At the present time Colorado is the only state authorized to use motor vehicle tax revenues to aid in financing a toll road.⁵

Even where legislative provisions authorize the use of state highway department facilities and personnel in the preliminary planning of possible toll-road facilities, the cost of these services must be repaid by the toll authority out of the proceeds of the eventual bond issue.

⁵ An attempt to allocate gas tax earnings to the Maine Turnpike was recently defeated. In Alabama an unsuccessful 1949 bill (H. 868) suggested that the proceeds of the state gasoline tax on gasoline sales at turnpike stations be paid into the turnpike sinking fund.

This strict demarcation between the financing of the toll facility and the finances of the highway department is insisted upon despite the fact that study of the feasibility of a toll road is made to determine whether the adequacy of the state's highway system might be improved by such additional facilities. If the decision is made to construct a toll road, the burden on the state highway system (as well as on the financial resources of the state) is thereby reduced. To withhold the use of the state's highway resources to conduct such investigations, therefore, is not simply a denial of aid to the toll road, but a failure to use the resources available to the highway department to explore possible solutions to the over-all highway problem.

The possibility of collecting cash tolls in conjunction with other methods of financing highways has been described in the case of the Westchester County and Connecticut Parkways. The toll in these instances is applied to roads originally built as free facilities, and is in the nature of an additional cash charge which the user is willing to pay to avoid the high operating costs and inconveniences of using alternate free routes. This application of the toll charge as a means of augmenting motor vehicle tax revenues is under consideration in Maryland as a possible solution to the problem of completing the modernization of certain principal routes in that state. Testifying before the House Committee on Public Works, the State Roads Commissioner pointed out that Maryland has legislative authority to construct toll roads financed with revenue bonds, but that the state was considering instead "the possibility of applying tolls as a subsidy to augment funds for the com-

pletion of highways between designated termini, which can be done more efficiently and economically than to construct roads as completely revenue-bond-financed projects."⁶

The use of toll revenues as a highway financing device, therefore, might involve a combination of toll and tax revenues, either by crediting tax revenues to a road financed through toll-secured revenue bonds, or by the collection of cash tolls on a road originally financed through traditional methods. Either approach might be preferable to financing a road solely with toll-secured revenue bonds or refusing to take any action which would depart from the so-called free-road principle.

Another possibility of achieving some degree of financial integration between the toll road and the highway system as a whole lies in using the credit position of the state to the extent possible to reduce financing costs. It has been noted that in New Hampshire, following a study of the financial feasibility of the proposed toll road in that state, it was decided that the risk of failure of the road to pay for itself out of tolls was so remote that the state should place its general credit behind the bonds as a means of reducing the cost of borrowing. New York will attempt to realize similar savings in the financing of its thruway system by seeking a constitutional amendment allowing general obligation bonds to be issued for the Thruway. The New York proposal to collect charges for use of the Thruway by the sale of special license plates is another attempt to integrate regular financing with extraordinary financing methods.

⁶ Statement by Robert M. Reindollar, *Federal-Aid Highway Act of 1950*, Hearings before the House Committee on Public Works, 81 Cong. 2 sess., p. 417.

ACCOMMODATING THE TRAFFIC

A significant criticism of the toll road, it has been noted, is that such a facility is unable to accommodate short-run traffic and is ill-adapted to solving the urban highway problem.⁷ One possible approach to overcoming these criticisms is suggested by the arrangement in Connecticut whereby traffic desiring to use the Merritt Parkway for short trips is accommodated by some 22 interchanges at which no toll collecting facilities are maintained. Short-run traffic is served toll-free on the grounds that the toll road can provide this public service free more economically than if tolls were charged. The extra cost of designing the road to make toll collection possible and the cost of maintaining the necessary collection facilities would exceed the revenues realized. In the case of the Maine Turnpike, a different solution to the short-run traffic problem is provided. Toll collecting is maintained at intermediate points which add little to the revenue of the facility, but this is done in order to make the service available to those who wish to use the road for short trips.

If the toll method is the only way to obtain the facilities needed, the public interest suggests that every effort be made to adapt such facilities to the traffic demands. Interchanges might be provided for vehicles on short trips regardless of whether the potential revenue from such users would be sufficient to warrant toll-collection facilities. But a preferable solution would be to accommodate short-run movements without charge

⁷ Proposals for urban toll roads have been under discussion in New York City (expressway across Manhattan) and Boston (from the North to the South Station).

as a means of freeing the congestion which would be created if toll collection were insisted upon.

Such an arrangement introduces the question of financial equity, since some would use the toll road free of charge and others driving longer distances would be compelled to pay for their use of the same facilities. This issue could be resolved by crediting the toll facility with the full amount of the gasoline taxes generated by short-haul traffic, which in turn would permit a reduction of the toll rates charged the long-distance user. By accommodating the short-run traveler toll-free, a higher degree of utilization would be achieved, thus reducing the demand for alternate free facilities.

CONCLUSION

Integration of toll roads with existing highways is essential to the most effective accommodation of traffic and to the elimination of overlap and duplication in highway administration and finance. The progress in highway development which has been achieved through state supervision need not be sacrificed by the introduction of this additional means of financing. And the federal government can fill an important role by revising its policy toward the imposition of tolls on roads constructed with federal-aid funds. Present federal-aid policy with respect to toll roads has not led to the expected rate of development of the interstate system; and in one state which is contemplating future imposition of tolls on this system, federal policy has led to the anomalous situation in which no federal money is being applied to these principal arteries so that the charging of tolls will not be challenged by federal authorities in the

event that the state should elect to levy tolls. Continuing its valuable advisory function of past years, the federal government can provide the leadership in seeking answers to a whole new set of policy questions raised by the possibilities of the toll road.

CHAPTER IX

SUMMARY OF FINDINGS AND CONCLUSIONS

Until recently there has been general agreement that the methods developed in this country for managing and financing our extensive system of roads and streets have been both equitable and effective. The principle that the cost of highways should be assessed in proportion to use and benefit has been applied through the medium of user charges consisting of gasoline taxes supplemented by registration fees. The proceeds of these charges have for the most part been dedicated to highway purposes. All states have provided specialized agencies for the programming, construction, and maintenance of roads and streets; and reasonably satisfactory working relationships have been maintained among the federal, state, and local levels of government. This generally successful approach to highway development, combined with the progress of the automotive industries, has made possible the tremendous growth of highway transportation in the United States.

Despite the achievements realized through existing methods of highway management and finance, there is growing evidence that some of our accepted concepts of highway management are no longer valid, or that defects in their application have made it impossible to accomplish some of the most important tasks which the demands of traffic have imposed. Despite the vast expenditures which have been made for roads and streets, major segments of the highway plant are inadequate to

provide efficiently for present traffic volume, and even less able to cope with anticipated traffic. A few states have dealt effectively with their most pressing problems of highway modernization, but for the most part the states find that their accumulated needs far outrun the revenues at hand or in prospect.

One of the most striking manifestations of the search for a way out is the revival of toll financing. In modern highway development this device has been used to finance certain high-cost bridges and tunnels, but until recently it has played only a small part in the provision of highways. The automotive and highway industries have in general opposed this method of finance, and have charged that resort to road tolls is a return to eighteenth century thinking. Nevertheless, in recent years more than half of the states have given consideration to the construction of toll facilities, and several highly important arteries have been or are now being financed in this way.

Reappearance of the toll gate is evidence that traditional methods of financing highways have proved inadequate to meet the needs of today's traffic. This inadequacy is reflected in the widening gap between available funds and the cost of bringing highway facilities to adequate standards. To some extent the gap has resulted from failure to increase current motor vehicle tax rates in keeping with the rising costs of construction and the greater outlays required to accommodate large volumes of high-speed traffic on main highways. But there is the further problem that, in many cases where the high cost of these facilities cannot reasonably be paid for out of current revenues, the alternative of borrowing is not offered because of state debt limita-

tions. It is difficult to enlist statewide support for constitutional amendments liberalizing debt limits because the traffic conditions requiring these extraordinary measures are so often localized. Even if sufficient funds in the aggregate can be supplied, however, either through current taxes or borrowing, there is the further difficulty of achieving the necessary concentration of these funds on particular high-cost projects. Under existing laws governing the distribution of highway funds among government units and systems of roads, increased taxes must generally be distributed in accordance with established formulas rather than concentrated on specific routes where the need is most urgent. Finally, in half of the states there is as yet no legal authority to build controlled-access highways.

It is in the face of these difficulties that many states are resorting to the toll method of financing high-cost facilities. The toll road, since it makes use of revenue bonds secured by the earnings of the facility rather than general credit bonds, is not subject to state debt limitations. The toll charge, which is paid only by those who care to use the facility, eliminates the difficulty of accomplishing an increase in the gasoline tax rate. The unique characteristic of a toll facility is that the money spent for it goes to build and maintain a specific project for which there is a need and a prospective willingness to pay the cost.

The popularity of the toll road among the motoring public is attested by the patronage of the Pennsylvania and Maine Turnpikes. The original section of the Pennsylvania Turnpike has recently been carrying 10,000 vehicles a day, and annual revenues exceeded 9 million dollars in 1950. The recent opening of the eastward

extension of the Turnpike and the current construction of the road to the west financed through the sale of revenue bonds at a favorable rate reflect confidence in the financial prospects of the venture. In Maine where the seasonal nature of the traffic suggests that the toll road might have the least prospect of success, 1950 traffic was close to 2 million vehicles, and revenue exceeded 1 million dollars. This is 20 per cent more operating income than was received in 1949. If the favorable trend in traffic continues, it should be possible to amortize the entire investment in about twenty years.

Favorable reception of toll-road developments by the motor vehicle owner has resulted despite the fact that use of a toll highway involves an average passenger car charge of 1 to 1.5 cents per mile. The additional cost is equivalent to a gasoline tax of 15 to 22 cents per gallon. This payment is in addition to the average state gasoline tax of approximately 5 cents per gallon. Presumably the motorist is willing to pay this high rate because the comfort, speed, and relative safety of using a road designed to modern standards, as compared with conditions on parallel free roads, seem worth the extra charge. By paying more for the road, the motorist may actually pay sufficiently less in gasoline consumption, tire wear, and other operating costs to achieve a net saving in his total cost of transportation. This is brought out by the fact that large numbers of long-distance truckers to whom cost is of vital interest, are willing to pay to use a toll road.

The physical characteristics of a modern road which permit these savings in vehicle operating costs, however, are in no way peculiar to a toll highway. There

are many miles of highway which provide a standard of service equal or superior to that of a toll road. The toll is merely a financing device to get the road quickly now, rather than tolerate inadequate standards for an extended period while the route in question awaits its turn for improvement.

Obviously, it would be preferable to enjoy modern highway facilities without resorting to toll charges. As we have seen, there is no inherent reason why this should not be possible. To do so would simply require a revision of traditional methods of highway finance to adapt them to the realities of present-day requirements. It would be necessary to obtain the required funds through an adequate level of charges, or through bonds where necessary, and to apply the proceeds where they are needed to provide maximum service to those who pay the bill.

That a solution to the highway problem along these lines has not been reached results in part from inertia and in part from the fact that existing policies in too many cases have resulted from compromise among the numerous interests involved rather than from objective appraisal of requirements. A basic defect is that tax rates and financial policies for the highway industry are determined by legislative bodies which cannot command the day-to-day expertness necessary for such tasks. Basic reforms are therefore required to correct the inequities and shortcomings in present highway policies. Scientific programing and cost determination must be substituted for political decisions, and the budgeting of highway revenues must be guided by demands of traffic. Attainment of these goals will be hastened to the extent

that the various highway transport and user interests adopt policy positions which reflect a more comprehensive view of the highway problem and a greater realization of the basic identity of purpose among all concerned with its solution.

Since it is clear that extensive revision of traditional highway financing policies on this basis will not be accomplished soon, there remains the problem of whether or to what extent the toll device should be used as a supplementary means of achieving the high-cost facilities which existing financial arrangements are often unable to supply. In attempting to answer this question, it has been necessary to examine the principal arguments against toll highways and to weigh these against the advantages of the toll device. For, granting the imperfection of established financing methods, direct toll charging also has inherent limitations and undesirable characteristics which in the short run may result in excessive costs and in the long run could undermine state highway management and adversely affect the economy of motor transportation.

Our evaluation of the factors noted above has resulted in the following conclusions:

1. The toll road solution at best can be applied to only a limited mileage of roads. The toll road offers no solution to the problem of crowded city streets, and in rural areas it must be limited to segments of the road system carrying high density traffic in order to assure self-support. It should be understood therefore that even where this device is acceptable, its use would not eliminate the need for basic revision of highway financial practices affecting the highway system as a whole.

2. The cost of financing toll roads through revenue bonds is substantially higher than financing by state government bonds. These increased costs result from higher interest rates, discounts, and fees. In short, the general credit of the state is superior to that of a special toll-road authority. Recent toll-road developments have demonstrated, however, that it is possible to avoid part or all of these higher costs. New Jersey did so to a degree by a forward commitment plan of borrowing from institutional investors, with substantial reduction of financing costs. In New Hampshire it was decided to borrow on the general credit of the state after toll-road cost and revenue estimates indicated so promising an outlook that the legislature was convinced that the state would not actually be called upon to aid the project. In New York a constitutional amendment permitted borrowing for the Thruway at low interest rates by the use of general obligation bonds. This possibility would not apply of course where debt limits could not be overcome. Too, the use of general obligation bonds for self-supporting facilities nullifies one of the principal advantages of the toll-secured revenue bond device, for the strict economic tests of feasibility are diluted.

3. Duplication of investment results where an existing right of way could be used for the reconstruction of the highway to limited access standards. However, such cases are rare since the decision to build a toll road generally presupposes intolerable conditions of width and alignment on the existing location. In most cases, a new right of way is required to provide limited access standards whether on a toll road or on a free road. Furthermore, in many areas the volume of present and

anticipated traffic requires two routes in order to segregate long-distance from short-run traffic. In such cases additional investment cannot be avoided.

4. The cost of toll collection is a substantial item peculiar to the toll highway. It has been found, however, that the percentage of these costs in relation to total outlays decreases rapidly as traffic expands. In the case of the Pennsylvania Turnpike, this item amounted to only 3.5 per cent in 1949. A factor offsetting toll-collection costs, moreover, is the development of concession revenues by toll-road authorities. Pennsylvania Turnpike concession revenues have been far in excess of toll-collection costs.

5. There appears to be no danger that free routes will be neglected in order to avoid competition with parallel toll roads. On routes where resort to a toll road is necessary to meet the needs of traffic, conditions on the free road would be such that maintenance standards could hardly be expected to influence the degree of competition with the toll facility. With respect to the similar charge that a modern free road would never be built parallel to a toll road, it appears that in the short run such a possibility would not arise, inasmuch as construction of the toll facility presupposes lack of funds to modernize the free road. In the long run, however, it is apparent that if a state in the meantime found itself financially able to build a parallel free road, it would not in prudence do so if traffic could be served by the two existing roads. In that case, funds available for a new road could be applied to freeing the toll road.

6. Toll charges undoubtedly constitute a form of "double taxation." That is, the user must not only pay the toll but must at the same time pay the gasoline tax,

the proceeds of which will be spent on other highways. It appears that the only logical solution to this situation is for the states to credit to toll roads a fair proportion of the tax earnings generated on such facilities.

7. A major deterrent to revenue bond financing is the uncertainty as to whether the roads so built will be able to pay their way in the long run. It has been contended that the state would have to take over unsuccessful facilities at a loss to the highway user. However, substantial safeguards are provided against such an eventuality by the careful surveys which are required before financing for toll facilities is forthcoming. If events should develop to prove these calculations wrong, however, it does not follow that the highway user would stand to lose. The bond holders who have accepted the risk in purchasing the bonds would in some cases have to absorb the losses incurred in refinancing the facility. In other cases the state might take over the road, but it would have a physical facility which up to that time would have been paid for out of tolls at no cost to the taxpayer. Thus the highway user would obtain an addition to the free-road system at reduced cost and would have benefited throughout the life of the toll road to the extent that this facility relieved traffic on the parallel free road. Nevertheless, the possibility that the state might have to take over a toll road emphasizes the importance of planning these facilities as an integral part of the state highway system.

8. Toll facilities should be integrated in so far as possible into the conventional system of managing and financing highway facilities. This follows from the fact that establishment of a toll authority might lead to damaging duplication of highway management, and to

conflicts between state highway planning and the programming of toll-road development. Such duplication could be avoided by planning the road in conjunction with the state highway system as a whole, by maximizing the common use of engineering services and equipment, and by placing responsibility for the toll road in the highway department rather than in an autonomous authority.

On balance it is concluded that the arguments against the toll road are not of such overriding importance that they preclude serious consideration of this method of finance. A state faced with the problem of modernizing inadequate facilities at high cost should first examine the avenues of remedy through the revision of conventional financing methods. If these do not appear fruitful, resort to toll facilities may be advisable provided such facilities are integrated with the over-all highway plan and carefully evaluated to assure their economic justification.

It is on the principal interstate rural highways that there exist most frequently the conditions which favor the adoption of toll financing. Federal attempts to hasten reconstruction of the interstate highway system have been discouragingly unproductive. Where federal-state co-operation on the free-road system has failed to achieve prompt modernization of a national road system, it may be possible for a selective development of toll highways to succeed. The federal government now aids the states in the financing of toll bridges. It appears that the same policy might be adopted with respect to toll roads and that existing prohibition against collecting

tolls on roads involving federal participation should be rescinded. Just as the toll bridge has proved indispensable to overcoming natural obstacles to the flow of traffic so the toll road may in future prove to be the only practical way of bridging the many other impediments to free traffic movement.

To the extent that a toll facility can be justified in advance by competent engineering and traffic surveys, the strict economic tests applied to such projects may have increasing appeal under current conditions of growing materials scarcity and increasing taxation. The toll road has the merit of introducing restraints on wasteful or unnecessary developments and of assuring strict balancing of costs and revenues. In past periods of plentiful resources the absence of these disciplines has frequently led to uneconomic highway undertakings and failure to build the right road in the right place. In view of the very high costs of expressways which must be incurred to facilitate the movement of today's heavy traffic, increasing importance attaches to careful calculations of economic justification. These calculations are a principal attribute of revenue bond finance.

To reject toll roads on the ground that the toll is "a return to eighteenth century thinking" may mean postponement of needed improvements and failure to realize the benefits of twentieth century engineering. Nevertheless, the ultimate solution for the modernization of the highway system requires much broader attack on the problems of highway administration and finance. Removal of the conditions which have led to the return of the toll road will require a revamped tax structure,

liberalized borrowing procedures, and revised expenditure patterns, all designed to raise the necessary funds and dedicate them to the most urgent highway requirements. Meanwhile the toll road can serve under limited circumstances as a supplement to traditional methods of highway development where opposing pressures make it impossible to achieve promptly the necessary reforms in highway management.

APPENDIX

TOLL ROADS

RECENT TOLL ROAD ACTIVITY^a

I. LEGISLATION IN EFFECT

State	Legislative Reference	Route	Jurisdiction	Comment
California	Assembly Bill 295 1949	Roads within 50 miles of toll bridges	Calif. Toll Bridge Authority and Dir. of Highways	
Colorado	H.B. 883 1949	Denver to Boulder	State Highway Department	34 miles under construction.
Connecticut	Chap. 107 1949	Merritt and Wilbur Cross Parkways	Merritt Pkwy. Comm. and State Highway Department	
Florida	Sec. 420 1941 Amended 1945	General	State Improvement Comm. and State Roads Commissioner	
Georgia	H.B. 189 1947	Georgia Coastal Scenic Route	Special Authority	
Kentucky	S. 109 1950	General	Dept. of Highways	
Maine	Chap. 69 1941	Kittery to Portland	Maine Turnpike Authority	400 miles authorized 1941; 44 miles in operation.
Maryland	Chap. 561 1947	General	State Roads Commission	Tolls may be collected on "free" roads for additional revenue.
New Hampshire	Chap. 295 1947	Mass. line to Seabrook-Portsmouth	State Highway Commissioner	Opened in summer of 1950.
New Jersey	Chap. 454 1948 Chap. 41 1949	General N. Y. line to Delaware River	New Jersey Turnpike Authority "	130 miles under construction.
New York	S. 1533 1945 S. 2779 1950	Saw Mill River and Hutchinson River Parkways N.Y.C. to Buffalo and Penna. line	Westchester County New York State Thruway Authority	Constitutional amendment for bond issue to be voted on, 1951.
North Carolina	1949	Va. Beach to Nags Head, N. C.	Municipal Corporations	Study under way for further legislation.
Ohio	S. 7, amended 1949	General	Ohio Turnpike Commission and Dir. of Highways ex officio.	First route being surveyed.
Oklahoma	S. 225 1947 H.R. 197 1949	Tulsa to Okla. City	Okl. Turnpike Authority and Governor ex officio	119 miles under construction.

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RECENT TOLL ROAD ACTIVITY^a—(continued)

State	Legislative Reference	Route	Jurisdiction	Comment
Pennsylvania	P.L. 774 1937	Irwin to Carlisle	Penna. Turnpike Commission and Secretary of High- ways ex officio	
	P.L. 972 1945		"	
	P.L. 949 1940	Extension to Philadelphia	"	Opened Oct. 1950. Completion due Dec. 1951.
	P.L. 101 1941	Extension to Ohio Line	"	
	P.L. 975 1949	To Scranton and Erie	"	
Texas	Charter from Sec'y of State 1950	Dallas to Houston	Texas Turnpike Co.	Proposed private undertaking.
Virginia	H. 608 1950	Va. Beach to Nags Head, N. C.	Coastal Turnpike Authority	
West Virginia	H.B. 428 1947	General	W. Va. Turnpike Commission and State Road Commissioner ex officio	Routes under study.

II. TOLL-ROAD STUDIES

Arkansas	Governor 1949	Little Rock to Benton	State Highway Department	Determined not feasible.
California	SCR 6 1950	San Francisco to Los Angeles	Div. of Highways	Report to legisla- ture due 1951.
Illinois	S. 528 1943	7 urban and 3 rural routes	Illinois State Superhighway Commission	One route ap- proved, Chicago to Northwest. Commission dissolved, 1949
Massachusetts	H.B. 2745 1949 H.B. 2444 1950	Connecticut to New Hampshire line	Massachusetts Turnpike Commission	First report un- favorable.
North Carolina	1950	South Carolina to Virginia line	Special committee of governor	Study under way.

III. RECENT UNSUCCESSFUL TOLL-ROAD PROPOSALS

Alabama	H. 868 1949	Tennessee to Florida line	Alabama Turn- pike Comm., Dir. of Highways ex officio	
Georgia	S. 156 1950	General	Georgia Turnpike Authority	
Kentucky	1948	Covington and Louisville to Tennessee line		

TOLL ROADS**RECENT TOLL ROAD ACTIVITY^a—(continued)**

State	Legislative Reference	Route	Jurisdiction	Comment
Michigan	S. 34 1949 S. 11-x 1950	General	Turnpike Authority in Michigan State Highway Department	
Minnesota	H. 1360 1949	Forest Lake to Duluth	Turnpike Commission, Comm. of Highways ex officio	
Missouri	H. 399 1949	St. Louis to Kansas City	Missouri Highway Department	
Nebraska	H.B. 317 1949	General	Department of Roads and Irrigation	
Rhode Island	H. 624 1950	Westerly to Massachusetts line	Southern Rhode Island Parkway Authority	
Wisconsin	S. 464 1949	General	Wisconsin Turnpike Authority	

^a Information compiled from legislative documents and news reports in periodicals. Additional legislation was introduced during January, February, and March 1951 in Arkansas, Georgia, Illinois, Indiana, Michigan, North Carolina, and Wisconsin.

PROPOSED PROGRAM FOR MAINE TURNPIKE FINANCING^a

Year Ending December 31	Estimated Net Revenue ^b	Bond Interest	Bonds Amortized at Par	Total Principal and Interest
1949.....	\$ 670,000	\$520,750 ^c	—	\$ 520,750
1950.....	706,000	529,000	\$ 86,000	615,000
1951.....	742,000	526,635	168,000	694,635
1952.....	778,000	522,015	211,000	733,015
1953.....	814,000	516,212	253,000	769,212
1954.....	850,000	509,255	348,000	857,255
1955.....	886,000	499,685	396,000	895,685
1956.....	922,000	488,795	444,000	932,795
1957.....	958,000	476,585	493,000	969,585
1958.....	994,000	463,027	545,000	1,008,027
1959.....	1,030,000	448,040	597,000	1,045,040
1960.....	1,066,000	431,622	651,000	1,082,622
1961.....	1,102,000	413,720	706,000	1,119,720
1962.....	1,138,000	394,305	763,000	1,157,305
1963.....	1,174,000	373,475	821,000	1,194,475
1964.....	1,210,000	352,950	878,000	1,230,950
1965.....	1,246,000	331,000	937,000	1,268,000
1966.....	1,282,000	307,575	998,000	1,305,575
1967.....	1,318,000	282,625	1,060,000	1,342,625
1968.....	1,354,000	256,125	1,124,000	1,380,125
1969.....	1,390,000	228,025	1,191,000	1,419,025
1970.....	1,426,000	198,250	1,257,000	1,455,250
1971.....	1,462,000	166,825	1,327,000	1,493,825
1972.....	1,498,000	133,650	1,397,000	1,530,650
1973.....	1,534,000	98,725	1,470,000	1,568,725
1974.....	1,570,000	61,975	1,545,000	1,606,975
1975.....	1,606,000	23,350	984,000	957,350
Total.....	30,726,000	9,554,199	20,600,000	30,154,199

^a Data from the Maine Turnpike Authority. \$15,000,000 revenue bonds at 2.50 per cent, \$5,600,000 revenue bonds at 2.75 per cent. Due February 1, 1976.

^b After operating and maintenance expense.

^c Includes interest for only a portion of the year on \$600,000 of the total.

PENNSYLVANIA TURNPIKE FINANCING^a
Relation of Net Revenues to Principal and Interest Requirements

Fiscal Year Ending May 31	Estimated Net Revenue ^b	Interest on Serial and All Term Bonds	Principal Requirements (due June 1)			Total Annual Principal and Interest ^c	Times Earned
			2½% Serial Bonds (1948)	3½% Term Bonds (1948) ^d	2.90% Term Bonds (1949) ^e		
1950.....	\$ 5,495,000	\$1,057,500 ^e	—	—	—	\$1,057,500	5.19
1951.....	5,845,000	1,057,500 ^e	—	—	—	1,057,500	5.52
1952.....	9,970,000	5,008,750 ^d	\$1,500,000	—	—	6,508,750	1.53
1953.....	14,708,000	6,098,750	2,000,000	—	—	9,361,510	1.57
1954.....	16,442,000	6,017,848	2,200,000	—	—	1,298,460	1.72
1955.....	17,830,000	5,931,431	2,400,000	—	—	1,935,180	1.84
1956.....	18,631,000	5,839,470	2,600,000	—	—	1,972,920	1.89
1957.....	19,206,000	5,741,938	2,700,000	—	—	1,411,865	1.94
1958.....	19,630,000	5,640,847	2,800,000	—	—	1,452,465	1.98
1959.....	19,930,000	5,536,348	2,800,000	—	—	1,494,080	2.02
1960.....	20,040,000	5,430,660	2,800,000	—	—	1,536,710	2.05
1961.....	20,170,000	5,323,754	2,900,000	—	—	1,580,355	2.05
1962.....	20,230,000	5,213,351	3,000,000	—	—	1,626,100	2.05
1963.....	20,230,000	5,099,161	3,000,000	—	—	1,672,560	2.07
1964.....	20,230,000	4,983,637	3,100,000	—	—	1,721,040	2.06
1965.....	20,230,000	4,864,471	3,200,000	—	—	1,770,530	2.05
1966.....	20,230,000	4,741,634	3,300,000	—	—	1,821,030	2.05
1967.....	20,230,000	4,615,097	3,300,000	—	—	1,873,320	2.06
1968.....	20,230,000	4,486,791	3,400,000	—	—	1,927,590	2.06
1969.....	20,230,000	4,354,669	—	—	—	9,502,279	2.12
						\$3,164,745	
						1,982,865	

1970.....	20,230,000	4,195,110	—	3,267,255	2,042,160	9,504,525	2.12
1971.....	20,230,000	4,030,524	—	3,372,780	2,099,445	9,502,749	2.12
1972.....	20,230,000	3,860,873	—	3,482,325	2,159,745	9,502,948	2.12
1973.....	20,230,000	3,685,940	—	3,593,880	2,222,055	9,501,875	2.12
1974.....	20,230,000	3,505,601	—	3,710,460	2,286,375	9,502,486	2.12
1975.....	20,230,000	3,319,636	—	3,830,055	2,351,700	9,501,391	2.12
1976.....	20,230,000	3,127,918	—	3,954,675	2,420,040	9,502,633	2.12
1977.....	20,230,000	2,930,199	—	4,083,000	2,490,000	9,503,199	2.12
1978.....	20,230,000	2,725,291	—	4,215,000	2,565,000	9,505,291	2.12
1979.....	20,230,000	2,513,919	—	4,352,000	2,640,000	9,505,919	2.12
1980.....	20,230,000	2,295,919	—	4,493,000	2,717,000	9,505,919	2.12
1981.....	20,230,000	2,071,103	—	4,640,000	2,796,000	9,507,108	2.12
1982.....	20,230,000	1,839,219	—	4,790,000	2,877,000	9,506,219	2.12
1983.....	20,230,000	1,600,111	—	4,946,000	2,960,000	9,506,111	2.12
1984.....	20,230,000	1,353,526	—	5,106,000	3,046,000	9,505,526	2.12
1985.....	20,230,000	1,099,247	—	5,273,000	3,134,000	9,506,247	2.12
1986.....	20,230,000	836,989	—	5,443,000	3,225,000	9,504,989	2.12
1987.....	20,230,000	566,566	—	5,621,000	3,319,000	9,506,566	2.12
1988.....	20,230,000	287,633	—	5,803,000	3,415,000	9,505,633	2.12

* Data from the prospectus of Drexel & Co. The "principal requirements" as used here do not indicate the manner in which net revenues are applied to the retirement of term bonds. Under the provisions of the Trust Indenture, no retirement of term bonds (from the application of net revenues) is permitted until all of the serial bonds have been retired.

^b After deducting maintenance and operation expenses and appropriations to insurance fund and replacement reserve fund.

^c Interest on both issues of term bonds is payable during this period from the extension funds.

^d Includes interest for six months on the 2.90% term bonds (1949 issue), the balance of the interest for such year being payable from the western extension fund.

* Includes redemption premium.

FEDERAL AID ALLOCATIONS^a

Comparison Based on Present Formula and Interstate System Cost
(Dollar figures are in thousands)

State	Interstate System		Federal Aid by States Actual 1950 ^c	Federal Aid by States on Basis of Interstate System Cost ^d	Per cent Increase or Decrease
	Cost of Improvement ^b	Per cent of Total ^b			
Alabama.....	\$ 87,976	0.78	\$ 8,740	\$ 3,342	-61.8
Arizona.....	92,108	.82	5,111	3,513	-31.3
Arkansas.....	78,289	.69	6,700	2,956	-55.9
California.....	1,169,427	10.38	19,837	44,470	124.2
Colorado.....	72,294	.64	6,825	2,742	-59.8
Connecticut.....	219,302	1.95	4,238	8,354	97.1
Delaware.....	49,429	.44	1,806	1,885	4.4
District of Columbia.....	180,870	1.60	2,643	6,855	159.4
Florida.....	115,263	1.08	6,254	4,370	-30.1
Georgia.....	175,728	1.56	10,302	6,683	-35.1
Idaho.....	50,243	.45	4,400	1,928	-56.2
Illinois.....	856,377	7.60	20,461	32,560	59.1
Indiana.....	389,437	3.46	10,679	14,823	38.8
Iowa.....	78,349	.70	9,848	9,999	-69.5
Kansas.....	89,783	.80	9,451	3,427	-63.7
Kentucky.....	181,933	1.61	7,966	6,897	-13.4
Louisiana.....	221,010	1.96	6,667	8,397	25.9
Maine.....	74,171	.66	3,460	2,927	-18.3
Maryland.....	242,278	2.15	4,267	9,911	115.9
Massachusetts.....	451,896	4.01	9,188	17,179	87.0
Michigan.....	416,399	3.70	14,771	15,851	7.3
Minnesota.....	161,511	1.48	11,007	6,126	-44.3
Mississippi.....	88,140	.78	7,184	3,342	-53.5
Missouri.....	235,284	2.09	12,757	8,954	-29.8
Montana.....	116,804	1.03	7,088	4,413	-37.7
Nebraska.....	48,239	.43	7,442	1,842	-75.2
Nevada.....	19,568	.17	4,338	728	-83.2
New Hampshire.....	40,329	.36	2,046	1,542	-24.6
New Jersey.....	404,053	3.59	8,386	15,380	83.4
New Mexico.....	58,110	.52	5,702	2,228	-60.9
New York.....	862,281	7.65	30,086	32,774	8.9
North Carolina.....	72,857	.65	10,177	2,785	-72.6
North Dakota.....	45,151	.40	5,270	1,714	-67.5
Ohio.....	758,591	6.73	17,767	28,832	62.3
Oklahoma.....	166,417	1.48	8,977	6,341	-29.4
Oregon.....	117,915	1.05	6,323	4,498	-28.9
Pennsylvania.....	926,579	8.22	22,181	35,216	58.8
Rhode Island.....	86,008	.76	2,882	3,256	24.2
South Carolina.....	119,569	1.06	5,552	4,541	-18.2
South Dakota.....	44,895	.40	5,530	1,714	-69.0
Tennessee.....	241,658	2.15	8,960	9,211	2.8
Texas.....	435,988	3.87	25,577	16,580	-35.2
Utah.....	84,253	.75	4,149	3,213	-22.6
Vermont.....	54,419	.48	1,812	2,056	13.5
Virginia.....	207,309	1.84	7,819	7,883	0.8
Washington.....	184,460	1.64	6,579	7,026	6.8
West Virginia.....	206,609	1.83	4,786	7,840	63.8
Wisconsin.....	127,904	1.13	10,414	4,841	-53.5
Wyoming.....	60,070	.53	4,271	2,271	-46.8
Total.....	\$11,266,372	100.0	\$428,416	\$428,416	—

^a See page 157, Chap. 7 for the basis for the recalculations of federal-aid allocation.

^b From *Highway Needs of the National Defense*, H. Doc. 249, 81 Cong. 1 sess., pp. 54-55.

^c From *Work of the Public Roads Administration*, Annual Report of the PRA, 1949, p. 80.

^d Amount which would be received by each state, assuming federal aid equal to 1950 allocation and percentage shares equivalent to percentage of needs of the interstate system.

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- Access points. *See* Limited access roads; Toll gates.
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- Administration, highways, defects in, 32-33, 57-59, 60-61 federal role, 159-60, 177-88 integration with toll authorities, 19, 40, 163-76, 185-86 state policy, 114-34, 117-88 toll-road legislation, 18-21
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